

HORTICULTURAL ABSTRACTS

INDEX TO
VOLUME XIX



1949

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NOTICE TO USERS OF THIS AND OTHER YEARLY INDEXES

The yearly index is prepared under pressure, its aim being immediate presentation of information.

COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

SCIENTIFIC STAFF, JANUARY 1949

Consultant Director Position vacant.

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Miss P. J. ROWE-DUTTON, B.Sc.Hort. (appointed 17th January, 1949).

HORTICULTURAL ABSTRACTS

Subject matter of abstracts

Horticultural Abstracts, first published in 1931, is the quarterly journal of the Commonwealth Bureau of Horticulture and Plantation Crops, the main purpose of which is to make known throughout the British Commonwealth the progress of research in those subjects. The abstracts are prepared from current and recent literature published in every part of the world in many languages.

The Bureau's primary concern is with horticultural and plantation crops and the application of science to them. It deals also with certain crops difficult to classify, such as potatoes, tobacco and a number of minor crops.

For the purposes of this journal horticultural crops include all those whose products normally appear as fruits, vegetables, nuts and flowers, while all tropical and sub-tropical perennials, such as tea, rubber, oil palm, sugar cane, etc., are considered to be plantation crops.

The storage and preservation of the products from the above crops are covered, in so far as they are the direct concern of the grower. For details of processing, Food Science Abstracts, issued by the D.S.I.R., and obtainable from H.M. Stationery Office, London, 6s. a number or annual subscription £2, should be consulted.

Availability

Copies printed on one side only can be obtained—see p. iii of cover.

Indexing of abstracts

Full subject and author indexes are issued for each volume. This fact encourages the hope that the omission of the Decimal Classification numbers from each abstract in future will cause little, if any, inconvenience to readers. Experience suggests that the accurate allocation of these numbers in the past has demanded an amount of skilled labour altogether disproportionate to the use made of the numbers.

Journals on closely related subjects

Plant Breeding Abstracts, Herbage Abstracts and Field Crop Abstracts, all issued by the C.A.B., deal respectively with the breeding of annual and perennial crops, with herbage problems and with field crops.

HORTICULTURAL ABSTRACTS

Vol. XIX

March 1949

No. 1

Initialled abstracts and reviews, not by Bureau staff, are by H. W. Miles of Wye College, S. R. Ball, N. H. Grubb, E. S. J. Hatcher, A. H. M. Kirby, A. M. Massee, S. C. Pearce, J. Taylor of the East Malling Research Station, G. St.C. Feilden and W. Filewicz.

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MISCELLANEOUS.

General.

1. (DEPARTMENT OF AGRICULTURE, SOUTH AFRICA.)

Agro-economic survey of the Union.

Bull. Dep. Agric. S. Afr. 270 (Econ. Ser. 34), 1948, pp. 192, 5 plates.

The main object of the survey is to demarcate typical agricultural areas, and gradually also the sub-areas, and their geographical boundaries, and then to analyse and describe their agricultural-economic structure. Maps of the Union are included showing soils, rainfall, vegetation, agro-economic areas, and distribution of native areas.

2. LESLIE, W. R.

Canadian prairie horticulture.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 70-4.

A highly informative account of horticulture under exacting conditions. The many points of interest include the following:—Temperature range is from -30° F. to close on 100° F. Precipitation is just over 20 in. Wind shelters are essential. The 625 acres of the Dominion Experimental Station at Morden are primarily devoted to horticulture including fruit, vegetables and ornamentals and there is a laboratory for quick freeze preservation. Hardiness is the essential. Pests are scarce. Pruning aims at low stature. Much breeding of fruits is done. The Far East has contributed considerably in trees and shrubs.

3. PRESCOTT, J. A.

Australia's special interest in plant introduction.

J. Aust. Inst. agric. Sci., 1948, 14: 102-3.

A short article stressing the fact that Australia, more than any other continent, stands to gain by the introduction of plants of likely economic importance.

4. SALISBURY, E.

The Royal Botanic Gardens, Kew.

Proc. roy. Soc. Lond., Ser. B, 1948, 135: 419-29, bibl. 3, illus.

A short review of the origin and history of Kew is followed by an account of its present organization and work, and some of its achievements.

5. BLINOVSKIĬ.

The Turkmen Botanic Garden. [Russian.]

Priroda (Nature), 1948, No. 8, pp. 88-90, illus.

The Turkmen Botanic Garden is at Ashabada on the southern border of Turkmenistan. A few kilometres to the north the Kara-Kum desert begins. It is the most southerly botanic garden in the U.S.S.R. and its proximity to mountains and desert, with drought conditions and wide fluctuations of temperatures, creates difficulties for the introduction of plants from other regions. The soil is desert clay highly carbonated and low in humus. The history of the garden since its origin in 1929 is outlined. At present it consists of two parts, one for dendrology, the other for ornamentals. A park is laid out with plants according to their geographical distribution—Europe, Mediterranean, Crimea-Caucasus, Asia Minor, Central Asia,

Eastern Asia, and North America. Native plants are arranged in 2-ha. plots with representatives of the mountain, desert, and clay soils.

6. CASHMORE, W. H.

National Institute of Agricultural Engineering.

Farming, 1948, 2: 298-302, illus.

An account of the aims and activities of this institute now situated at Silsoe, Bedfordshire. As regards its services to horticulture, the main problems receiving attention are those connected with the development of horticultural tractors, irrigation, precision drilling of seed, and the more efficient use of heat in glasshouses.

7. CROCKER, W.

Developments in plant research.

Reprinted from *Anglo-Amer. Industr. Newsletter*, Jan. 1947, pp. 23-6.

A condensed account of the objects and some achievements of the Boyce Thompson Institute for Plant Research, New York, established 1924.

8. MINISTRY OF AGRICULTURE, THE HAGUE.

For your information.

[Publ.] *Netherlands Minist. Agric., Fish. and Food*, 1947, 2nd edit., pp. 35.

A booklet for English-speaking visitors to Holland giving concise information on the organization of the Ministry, its agricultural education and information services, the current programme of agricultural investigations, and the names and addresses of 77 scientific institutions and their directors.

9. ISTITUTO NAZIONALE DI ECONOMIA AGRARIA.

The situation of agricultural economics of Italy.

Edizioni italiane, Rome, 1948, pp. 47.

The chief interest to the outsider lies in the short account of the various Italian Institutes and research centres which are concerned with agricultural economy. The chief Academies are those dei Georgofili of Florence, di Agricoltura of Turin, di Agricoltura di Bologna, Agraria di Pesaro and the Società Agraria di Lombardia at Milan.

10. POLLARD, A. G.

Agriculture and horticulture.

Rep. Progr. appl. Chem., 1946, 31: 478-503, bibl. 175.

The more important papers on which this review is based have been briefly abstracted for this journal. Subjects of special horticultural interest discussed include the following: The potash nutrition of pineapple, orange, tobacco, and kok saghyz and its influence on composition; manganese deficiency in onion, bean, pea and fruit trees, and the influence of manganese on ascorbic acid content; magnesium deficiency in tomato and apple; dormancy breaking in potato, potato manuring and the relationship of various factors to potato quality.

11. ANON.

Il lessico delle piante utili. (A lexicon of economic plants.)

Riv. Agric. sub trop., 1948, 42: 157-9.

A note of the fact that an important dictionary of

economic plants throughout the world has been in preparation since 1942 at the Istituto Agronomico per l'Africa Italiana of Florence. So far some 15,000 species have been recorded, covered by about 87,000 references.

12. STEARN, W. T.

The use of the term "clone".

J. roy. hort. Soc., 1949, 74: 41-7, bibl. 19.

"Recognition of the clone as an important and potentially long-lived if not immortal unit of plant life carries with it a recognition of the necessity of keeping clones free from disease." The old theory that final degeneration of vegetatively propagated stock is inevitable is discussed in the light of modern knowledge of virus infection, and the evidence of very ancient clonal varieties. The importance of selection of healthy strains (such as Royal Sovereign Mallard 40) in maintaining the vigour of a clone is stressed. The origin of the word and its genetical implications are discussed.

Climate and its manipulation.

13. WOOD, C. A.

The glass is low.

Weather, 1948, 3: 270-7, bibl. 2, illus.

An instructive and diverting exposition of how to draw up synoptic weather charts from Airmet broadcasts (see *H.A.*, 17: 1872), and of how to forecast from these.

14. TRUMBLE, H. C.

Rainfall, evaporation and drought-frequency in South Australia.

J. Dep. Agric. S. Aust., 1948, 52: 55-64, illus.

Meteorological data are presented in tables and maps of the southern area of South Australia.

15. BANNON, J. K.

Rain making.

Weather, 1948, 3: 261-6, bibl. 11, illus.

A review of the possibilities of the artificial stimulation of rain, opening with an outline of the Bergeron theory which indicates that the presence of ice crystals is essential for rain formation. This is followed by a discussion on the artificial seeding of clouds with dry ice (solid CO_2) sprinkled from aircraft over suitable clouds, a process which has been shown to cause rain to fall in certain circumstances. Regarding practical possibilities, it is shown that special conditions are necessary for successful rain making. Thus in Britain prolonged droughts are almost always associated with anticyclonic conditions when clouds, if any, are in shallow layers and quite unsuited for stimulation to produce rain. In other parts of the world, however, seeding might be successful, as in some warmer climates, where at certain seasons large cumulus clouds build up day after day, only reaching the shower level infrequently. There is another possible application of seeding; it may be possible to speed up rain so that most of it falls in one place. It has also been suggested that, if a growing cumulus cloud is seeded, it may be induced to release much of its water before it can develop into a thunderstorm. Experiments on artificial stimulation of rain are of the highest importance, and the results of further experiments are awaited with great interest.

16. KING, J. A., AND OTHERS.

Artificial stimulation of rain.

Nature, 1948, 162: 921.

"Dry ice" was released from aircraft into developing cumulus cloud or incipient thunderstorms over the Transvaal. As a result precipitation was induced at an earlier stage in the life of the cloud, but it is not yet possible to say whether the intensity and duration of the rainfall, which would probably have occurred anyhow, was affected by this "seeding" method.

Statistical method.

(See also 681.)

17. FINNEY, D. J.

The inevitability of statistics.

Analyst, 1948, 73: 2-6.

A paper written for "those who know that statistical analysis of their data is unimportant". Consideration of the variability of data shows the necessity for a knowledge of the general principles on which statistical analysis is based. J.T.

18. YATES, F.

The place of statistics in agricultural research.

Reprinted from *Agric. Progr.*, 1946, Vol. 21, pt. 1, 11 pp.

A plea for the active and close co-operation of biologists and statisticians in the carrying out of agricultural experiments, especially in the early stages. Many examples are given of the sorts of problem on which statisticians can usefully be consulted. S.C.P.

19. WELLMAN, R. H., THURSTON, H. W., JR., AND WHALEY, F. R.

A method for correcting for geographic variation in field experiments.

Contr. Boyce Thompson Inst., 1948, 15: 153-64.

The method is similar to that of Papadakis but more elaborate. It is demonstrated only with fictitious data. S.C.P.

20. FINNEY, D. J.

Orthogonal partitions of the 5×5 Latin squares.

Ann. Eugen., 1946, 13: 1-3.

Although this paper is strictly a contribution to the mathematical theory of Latin squares, it may well be of use to the experimenter with perennial plant species. Given a 5×5 Latin square that has fulfilled the purpose for which it was originally designed, this theory enables it to be used for a comparison of a new set of treatments. S.C.P.

Glasshouse and other problems of light.

(See also 6, 114, 252, 688, 705, 724d.)

21. RICHARDSON, C. S.

Design for a commercial glasshouse without interior posts.

N.Z. J. Agric., 1948, 77: 241-5.

An article illustrated with drawings and photographs and containing dimensions of timbers. The design is simple, gives structural stability with freedom from interior ground obstruction, and the cost is relatively low in comparison with that of other wood-steel types.

22. BENNETT, L. G.

Fuel supplies and the glasshouse grower.*Agriculture*, 1948, 55: 395-8, bibl. 4.

Largely concerned with observed variations in fuel consumption rates per unit of surface area.

23. M., L. G.

Insulation of greenhouses.*Agric. Engng Rec.*, 1948, 2: 146-7.

The amount of fuel necessary each year to keep a greenhouse warm may be as much as 400 tons an acre, and any substantial reduction in heat loss at night by the use of insulation would, therefore, result in a considerable saving. Glass is a good insulator when compared with most materials of the same thickness, but the small thickness practicable limits its effective insulation. The insulation property of a sheet of greenhouse glass is similar to that of $\frac{3}{4}$ -in. tongue and groove boarding, but is less than half as good as a 9-in. brick wall. Cork, glass wool, fibre board, or other cellular materials provide good insulation because of their low conductivity. In order to obtain more information on the value of insulating greenhouses, preliminary experiments with aluminium foil have been carried out recently by the N.I.A.E. For ease of manipulation the experiments were made in cold frames instead of greenhouses. The minimum temperature at night of the frame insulated with aluminium foil was 6° F. higher on the coldest night than that of the uninsulated frame, with an average difference of 4°. It was also found that seed germination occurred a week earlier in the insulated frame. The results were considered sufficiently positive to justify further research, and work is now in progress with a greenhouse arranged so that one section can be insulated at night by roller blinds made of Alfol kraft paper faced on each side with a very thin sheet of aluminium foil.

24. VAN DEN MUIJZENBERG, E. W. B.

Enige proeven met verschillende licht- en stralingsbronnen bij kasplanten. (Trials with various kinds of light and sources of radiation on glasshouse plants.) [English summary 9 l.]

Meded. Direct. Tuinb., 1948, 11: 495-502, bibl. 8, illus.

The action of different sources of illumination—"fluorescent daylight", hot white tubes, neon tubes, incandescent bulbs and radiation elements—has been studied on cucumber and tomato plants under Dutch lights. The soil was heated by electric cables and the air by radiation elements. Fluorescent tubes can be used instead of neon tubes; they promote growth better than incandescent bulbs, and so can be recommended for use during winter months. Uniformity of development is promoted by using panes of glass for the sides of the benches.

25. VAN DEN MUIJZENBERG, E. W. B.

Het licht in de kas. (Glasshouse lighting.) [English summary 11 l.]

Meded. Direct. Tuinb., 1948, 11: 514-21, bibl. 25.

The development of glasshouse construction in relation to the quantity of light admitted is reviewed and the influence of the construction and style of glasshouses

on natural illumination is discussed. In this century the application of artificial light has developed, and the construction of artificially ventilated houses, in which the carbon dioxide content of the air can be regulated and the crop exposed to light from fluorescent tubes, is considered to be practical. The intensity of the light inside a house is about 75% of that outside. Between full grown tomato plants at soil level an intensity of just over 10% has been recorded.

26. ROODENBURG, J. W. M.

De bruikbaarheid van verschillende lichtbronnen voor het bevorderen van de groei van kasplanten. (The applicability of different sources of light for stimulating the growth of glasshouse plants.) [English summary $\frac{1}{2}$ p.]

Meded. Direct. Tuinb., 1948, 11: 522-8, illus.

The choice of source of artificial lighting for stimulating the growth of plants in greenhouses depends on the species of plant and the result desired, as: 1. *Stimulation of photosynthesis*; neon light as supplement during the night, 50-100 watt per square metre (e.g. raising seedlings). 2. *Prolonging the daylight*; weak illumination of incandescent lamps, 5-50 watt per sq. metre according to the species (e.g. to extend the growing period of begonias, 5-10 watt per sq. metre). 3. *Forcing with infra-red rays*; rather powerful incandescent light, at least 100 watt per sq. metre (e.g. forcing tulips without daylight). 4. *Elimination of blue light deficiency*; slight addition of mercury vapour light (important for plant culture without daylight). For areas of limited size satisfactory results have been obtained with a small germination apparatus equipped with fluorescent light, daylight being excluded.

27. BURRIDGE, H. F. B.

Uneven span glasshouses.*Grower*, 1949, 31: 19.

A letter questioning the theory that in an uneven span glasshouse orientated east and west the long south side provides greater illumination during winter. Reasons are given.

28. LAWRENCE, W. J. C.

The shape of the east-west house.*Grower*, 1949, 31: 20-3.

A reply to the above in which the writer re-affirms that for single glasshouses, east-west orientation should give better results from October to March than north-south. For multiple glasshouses there are no reliable data, therefore growers would be well advised to retain the traditional north-south, even span, construction for the present.

29. BROWN, C. A. C., AND GOLDING, E. W.

Electrical pre-warming of tomato house soil.*Agriculture*, 1949, 55: 447-50, bibl. 2.

An account of experiments concerned with developing a practical technique and determining whether it could be applied for less than the cost of using coal in the ordinary way. With the system of wiring used it was found that a specific loading of at least 5 watts per square foot of soil surface is necessary to ensure the required temperature rise in reasonable time. To get a temperature rise of 10° F. at 6 to 8 inches depth the consumption is about 100 kWh. for each 1,000 square

feet of soil surface, i.e. cost 8s. 4d., at 1d. per kWh. Further, under the range of conditions met both in the course of the investigations and elsewhere, the required temperature was reached in heating periods ranging from 15 to 35 hours, i.e. cost from 6s. 3d. to 14s. 9d. per 1,000 square feet. Rarely was more than 24 hours required. The transformer low voltage method was used. Most commercial requirements will be met by using 15 or 30 volts. One advantage of the low voltage method of soil warming is that the transformer—the expensive item—need not be large, as it can be moved from one section to another. Galvanized steel wires, 9 to 12 standard wire gauge, were used as heating elements, laid on the grid system. The depth of laying depends mainly on the grower's requirements: 9 in. is a convenient depth. A rough guide is given to the present-day cost of soil-warming equipment suitable for areas of from 200 to 3,000 sq. ft. [See also *Tech. Rep. W/T 15* with same title, *H.A.* 18: 1902.]

30. JACKSON, A. A.

Fuel and the future glasshouse [in Britain].

Grower, 1949, 31: 59-60.

The suggestion is made that the glasshouse of the future will be a well insulated structure, exposing the minimum of glass, with insulating blinds for night use, and with additional artificial illumination. An insulated house of this kind, by reducing heat-loss, would enable electricity to be used as a source of power and, if radiant heat from incandescent lamps were used, the additional light required might be considered as a waste product of the source of heat. The advantages of houses of this type will be complete control of temperature combined with fuel economy, complete control of light and ease of operation. The logical conclusion is that natural light will become less and less important for winter crop production. For maincrop production, in the light though often cold summer months, growers will continue to cover land with glass in the cheapest possible way. The Dutch light structure seems to be the answer here as a well-made structure, with a flattened ridge, exposing the minimum of glass to the atmosphere. The Dutch light structure correctly used has another great advantage over the standard glasshouse: it is temporary and so goes some way towards avoiding the expensive necessity of large-scale steam sterilization.

31. WASSINK, E. C.

De lichtfactor in de fotosynthese en zijn relatie tot andere milieufactoren. (The light factor in photosynthesis in relation to other environmental factors.) [English summary 1/2 p.]

Meded. Direct. Tuinb., 1948, 11: 503-13, bibl. 28.

In photosynthesis if there is a limiting factor other than light, a typical "Blackman" light saturation curve is obtained. In leaf discs, CO_2 , in equilibrium with Warburg buffer No. 9 is a limiting factor even at fairly low light intensities. Increase of CO_2 -tension up to 9% completely overcomes this limitation. Strawberry plants in sodium light showed light saturation at about 7×10^4 ergs/cm²sec. at 17°, and at 14×10^4 ergs/cm²sec. at 25° C.

32. ŠČEGLOVA, O. A., AND ERMOLAEVA, E. JA.

The results of Soviet science in the study of photoperiodism. [Russian.]

Priroda (Nature), 1948, No. 7, pp. 30-4.

The rate of progress in photoperiodism investigations in Russia, as indicated by the number of papers published, is shown graphically. The results obtained are then summarized in three directions, the first being in relation to the reaction of plants to daylength according to their geographical distribution. This is followed by an account of the influence of the photoperiod on physiological and biological processes and on anatomo-morphological modifications, e.g. the transition from vegetative to reproductive phases and the interruption of sexual dimorphism, the size of roots in root crops and of root nodules in leguminous plants, as well as changes in physiological processes such as photosynthesis and respiration and the amount of chlorophyll and other pigments in the anatomical structures of leaves and stems. In the third direction studies have been made into the theory of photoperiodism, particularly with reference to "photoperiodic induction" and the transference of impulses from leaves to growing points and from treated rootstocks to scions. The effect of alternation of light and darkness in relation to the significance of short periods of light during the dark periods has also been studied.

Experimental technique.

33. SANDERSON, M.

An experiment to measure potential evapotranspiration.

Canad. J. Res., 1948, 26, Sec. C, pp. 445-54, bibl. 4.

The construction of a simple instrument, the evapotranspirometer, is described, which makes it possible to obtain accurate daily readings of potential water needs. The first season's experiments were carried out with grasses.—Ontario Research Foundation, Toronto.

34. JENNY, J.

Désinfection de la terre à l'électricité. (Electrical soil disinfection.)

Rev. hort. suisse, 1948, 21: 309-10.

An apparatus is described and illustrated which was specially designed to combine rapid soil sterilization with economy in current. The soil is filled in between rows of metal tubes each containing an electric element. The apparatus is fitted with a thermostat and an alarm.

35. BOUYOUCOS, G. J., AND MICK, A. H.

A fabric absorption unit for continuous measurement of soil moisture in the field.

Soil Sci., 1948, 66: 217-32, bibl. 11.

Fabric absorption units for making electrical resistance measurements of the complete range of soil moisture from saturation to air-dryness may supplement plaster of Paris blocks in wet and saturated conditions where the latter do not function satisfactorily.

36. BURTON, W. G., AND SPRAGG, W. T.

An apparatus for the extraction of gas from small amounts of plant sap or tissue.

New Phytol., 1948, 47: 17-21, bibl. 11.

The apparatus described and illustrated was designed

to remove from plant tissue the whole of the gas, dissolved as well as intercellular, for use with sap or tissue of the order of 1 ml. in volume.—Low Temperature Research Station, Cambridge.

37. RICHES, J. P. R.

An introduction to polarographic methods and their application to the analysis of plant material.

New Phytol., 1948, 47: 1-16, bibl. 91.

The principles of polarography and the work of previous writers on the subject are reviewed. The polarographic method offers a new and very sensitive aid in the analysis of plant material. The difficulties in using it for estimating trace elements in plants are pointed out and methods for obviating such difficulties are discussed.—Botany School, Cambridge.

38. DROSDOFF, M., AND NEARPASS, D. C.

Quantitative microdetermination of magnesium in plant tissue and soil extracts. A rapid colorimetric method.

Analyt. Chem., 1948, 20: 673-4, bibl. 5.

A rapid quantitative colorimetric method is proposed for the determination of magnesium in plant tissue and soil extracts. It is based on the use of thiazole yellow and a compensating starch solution to give a reproducible color that can be measured in a photoelectric colorimeter. It is not necessary to remove iron, aluminium, manganese, phosphorus, or calcium. Both the precision and accuracy are well within accepted standards for colorimetric methods. [Authors' summary.]—U.S.D.A., Gainesville, Fla.

39. VAN RAALTE, M. H.

Bepalingsmethoden van ionen belangrijk voor de voeding van de plant. (Determination of ionic concentration in nutrient solutions.)

Abstracted from *Versl. Treub Laboratorium, Buitenzorg in Chron. Nat.*, 1948, 104: 252.

Colorimetric and spectrographic methods of determining ionic concentrations are not sufficiently sensitive for the low concentrations needed for nutrient solutions. Only phosphates could be determined in this way. The author has worked out a method for the determination of ammonia, in which the NH_4 solution is filtered through a tube of activated charcoal. The NH_4 ions are held by this, to be liberated later by NaCl solution. Thus an NH_4 solution can be obtained that is 30 times as strong as the original, and this can be determined colorimetrically. This method should be applicable to other ions.

40. FLEMION, F.

Reliability of the excised embryo method as a rapid test for determining the germinative capacity of dormant seeds.

Contr. Boyce Thompson Inst., 1948, 15: 229-41, bibl. 74.

Studies on the determination of the germinative capacity of seeds by observing the behaviour of excised embryos has been extended to include 58 species representing 19 families. The techniques employed for the excision of the embryos are described. Various kinds of seeds with various degrees of viability were tested. Agreement between the rapid viability

method and germination tests was close. In a statistical analysis of these data combined with those previously published by the author a highly significant correlation between the two methods was obtained. [Author's summary.]

41. FLEMION, F., AND POOL, H.

Seed viability tests with 2,3,5-triphenyltetrazolium chloride.

Contr. Boyce Thompson Inst., 1948, 15: 243-58, bibl. 33.

A series of experiments are reported, designed to determine whether seed viability can be accurately estimated by the use of 2,3,5-triphenyltetrazolium chloride as a staining agent. Dead embryos rarely stained, while with viable embryos various types and degrees of staining were obtained. These staining results were compared with the percentage of embryos found viable by observing the behaviour of the excised embryos (rapid viability method). One hundred different seed lots representing 17 plant families and 58 species were tested. Before the tetrazolium technique used in this survey can be recommended for any given species much more detailed work is necessary. [From authors' summary.]

42. H., E. R.

The future of the horticultural tractor.

Agric. Engng Rec., 1948, 2: 139-41, illus.

In the past horticultural tractors have often been modified forms of farm tractors designed for large acreages. The requirements to be met in a tractor specially designed for horticultural purposes are specified.

Nutrition.

(See also 73p, 362-364.)

43. WALLACE, T.

Nutrition problems of horticultural plants, with special reference to trace elements.

(Masters memorial lectures, 1948.)

J. roy. hort. Soc., 1948, 73: 366-80, 423-38, bibl. 29, illus.

The lecturer outlines present-day views on the mineral nutrition of plants, with special reference to trace elements, and shows how this knowledge can be applied in gardens.

44. BURSTRÖM, H.

Mineral nutrition of plants.

Ann. Rev. Biochem., 1948, 17: 579-600, bibl. 91.

The literature of the year 1946/47 is reviewed under the following heads:—availability of mineral nutrients in the substrate, the mechanism of ion absorption, essential nutrient elements, and effects and functions of the elements.

45. BRENCHEY, W. E.

The rôle of minor elements in the growth of plants.

Reprinted from *Chem. Prod.*, May-June, 1946, 7 pp. [received 1948].

A short review of the progress in the physiology of plant nutrition from the end of the eighteenth century, followed by an account of nutritional experiments

carried out at Rothamsted with a number of minor elements.

46. MONIGATTI, J. D. W., AND OTHERS.
Indicator plants. I. Virginia stocks as an indicator of lime availability.
N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp. 58-71, illus.

Pot experiments show that Virginia stock (*Malcomia maritima*) responds quantitatively in growth to the lime availability in a soil as measured by base-exchange methods and shows also an increased emergence with increased lime availability.

47. RUSSELL, R. S., AND MARTIN, R. P.
Use of radioactive phosphorus in plant nutritional studies.
Nature, 1949, 163: 71-2, bibl. 10.

"Significant radiation effects [damage] have been observed when the level of phosphorus-32 is 10 μ C./litre. . . . Although these findings do not indicate any obstacles to the use of tracers in plant studies which cannot be overcome by careful techniques, the conclusion is inescapable that in general the hazard of radiation damage has not been sufficiently realized. . . . The value of the results of any tracer investigation is doubtful unless the absence of radiation damage is established. . . ."—University of Oxford.

48. BERTRAND, G., AND BERTRAND, D.
Teneur en rubidium de diverses familles du phanérogames. (The rubidium content of families of phanerogams.)
C.R. Acad. Agric. Fr., 1948, 34: 829-30, bibl. 5.

The results of analyses are given in mg. per kg. of dried material. They show that the rubidium content of plants varies from 11.2 mg. in the *Labiatae* to 31.2 in the *Caryophyllaceae*.

49. SHEAR, C. B., CRANE, H. L., AND MYERS, A. T.
Nutrient-element balance: application of the concept to the interpretation of foliar analysis.
Proc. Amer. Soc. hort. Sci., 1948, 51: 319-26.

The authors give reasons why even complete leaf analysis can give only a partial picture of the nutritional status of a plant and must always be correlated with expressions of growth or yield responses for intelligent interpretation. They discuss certain concrete examples which bear this out. They stress the importance of taking into consideration in the interpretation of foliar analysis the effects which varying supplies of the individual nutrient elements may have on the absorption and accumulation of one another. The many factors involved need to be realized and concertedly studied. [See also *H.A.*, 18: 2934, 2935.]

50. NICHOLAS, D. J. D.
Chemical tissue tests for the determination of the mineral status of plants.
Chem. Industr., 1948, pp. 707-12, bibl. 38.

In a paper read before the Agricultural Group of the Society of Chemical Industry in February 1948 the author discusses the rapid tissue test methods used at Long Ashton in nutritional studies. The chief merits are (1) that they permit the recognition of deficiencies at an early stage, before visual symptoms appear, and

(2) that they may replace "total" chemical analysis for the rapid diagnosis of mineral disorders.

51. QUASTEL, J. H., HEWITT, E. J., AND NICHOLAS, D. J. D.
The control of manganese deficiency in soils.
1. The effects of sulphur and thiosulphates on crops growing on manganese-deficient soils.
J. agric. Sci., 1948, 38: 315-22, bibl. 22.

Concerns pot and field experiments comparing the effects of thiosulphates and sulphur in the incidence of manganese-deficiency in certain crops, including beet and pea, growing in two manganese-deficient soils in England.

52. BOLAS, B. D., AND PORTSMOUTH, G. B.
Effect of carbon dioxide on availability of manganese in soil producing manganese deficiency.
Nature, 1948, 162: 737.

Potato plants growing in a drained lake-bed at East Malling Research Station showed symptoms of acute manganese deficiency in a soil with a Mn content considerably greater than 50 p.p.m. on a dry basis, the soil pH being 8.0-8.5. Plants grown in pots in the same soil with the same pH value did not exhibit any or only slight deficiency symptoms. The results of experiments, in the course of which water saturated with acid-free CO₂ was added to the soil, support the hypothesis that local accumulations of CO₂ in the root area may render manganese available to the plant without bringing about a general change in the pH value.—Imperial College of Science, London.

53. DIKE, K.
The use of anhydrous ammonia as fertilizer.
Chron. Nat., 1948, 104: 150-4, bibl. 7, illus.

Two methods are described: "nitrogation", or the application of liquid ammonia to irrigation water; and "nitrojection", or the injection of NH₃ gas directly into the soil.

54. ANDREWS, W. B.
The use of anhydrous ammonia as a source of nitrogen.
Food and Agric., 1948, 1: 542-3, bibl. 3, illus.

A short article on some properties of anhydrous ammonia, its effect on certain crops, and the equipment used for applying it. In 1947 Mississippi farmers applied anhydrous ammonia—the cheapest form of N in the U.S.A.—to over 200,000 acres of crops.

55. PLAUT, M., AND HURWITZ, S.
Organic substitutes for animal manure: I. Huminal.
Bull. agric. Res. Stat., Rehovot, 46, 1948, pp. 35, bibl. 11, illus.

A record of experiments conducted over 3 years to determine the duration of the effect of various organic manures on irrigated crops, including potatoes and peas, grown in rotation. Huminal is prepared from peat, treated with ammonium bicarbonate, to which various plant nutrients are added.

56. LEPELTIER-BEAUFONDS, A.
La zymothermie (ou fabrication de l'humus). (Zymothermy or the preparation of humus.)
Rev. agric. Réunion, 1948, 48: 227-32.

The author defines zymothermy as an aerobic fermentation, oxidizing plant and animal refuse, produced in closed containers of 50,000 l. capacity without the supply of any external heat, spontaneous combustion producing a temperature of 50-85° C. If the chemical reactions threaten an outbreak of fire, air is admitted carefully. Substances suitable for treatment are described and the chemical composition of the final product, Zymos, and its general properties are outlined. Places where zymothermic plants are to be found in France are mentioned.

57. BLONDEL, L.

Fumier artificiel et l'utilisation des marcs de raisin. (Artificial fertilizers and the use of grape residues.)

Bull. Serv. agric. gen. Algér. **148**, 1948, pp. 7.

A popular bulletin, including instructions for the preparation of compost from grape pomace, which must first be neutralized.

Irrigation.

(See also 540.)

58. ANON.

Irrigation Research Station, Griffith, N.S.W., Australia.

Publ. Coun. sci. industr. Res. Aust., 1947, pp. 16, illus.

Describes the development of the station, its research programme, and the services provided. There is a list of staff.

59. HARDY, E.

Water "divining" by study of plant life. New botanical theory that will help to prevent erosion and aid irrigation.

Crown Colon., 1948, **18**: 634, illus.

A short expansion of the observation that variations in the amount of subterranean water in arid and semi-arid areas are reflected in the surface vegetation, the components of which act as indicator plants.

60. LAMONT, N.

Water-spreading methods in irrigated areas of U.S.A.

N.Z. J. Agric., 1948, **77**: 149-50, illus.

The author reviews, for the guidance of New Zealand growers, irrigation methods in the United States. He writes that the most popular method of distributing water in orchards and vineyards is by furrows. The tree rows are usually planted "along the line of greatest slope", and a number of furrows, usually 4, 6 or 8, is shaped up between pairs of rows, in order to regulate the flow of water in each furrow so that it just reaches the end of the run, the flow being maintained until the soil has been saturated to the required depth. If the soil is relatively impermeable and its fall fairly steep, a very small flow may be run into each of many furrows and maintained for perhaps as long as 2 or 3 days. Where soils are more permeable and slopes less steep, a bigger flow in fewer furrows for a shorter time is allowed.

61. VEIHMEYER, F. J.

Sprinkling for irrigation.

Circ. Calif. agric. Exp. Stat. **388**, 1948, pp. 19, illus.

This is largely a condensation of information published

more fully in *Bull.* 670 of this Station, see *H.A.*, **16**: 1464. The following aspects of the subject are briefly dealt with: rotating and fixed head sprinklers; stationary, semi-portable, and portable systems; couplings and pumps for portable systems; travelling sprinklers drawing water from ditches; advantages and limitations of sprinkler irrigation; some estimates of costs.

62. KEMP, H. K., HALLIDAY, O. E., AND SPURLING, M. B.

Sprinkler irrigation investigation.

J. Dep. Agric. S. Aust., 1948, **51**: 588-93; **52**: 19-23.

This progress report, summarizing observations made at the Berri Experimental Orchard and in the metropolitan area, is limited to the horticultural aspects of sprinkler watering, particularly the practical orchard manipulation of plant and resulting water distribution. It is in six sections. I. Handling and maintenance. II. Variation in water distribution between heads in the spray lateral. III. Distribution patterns, single heads. IV. Water distribution of the combined heads patterns. V. Water distribution in a mature citrus planting. VI. Effects of sprinkler watering in tree crops.

63. DEPARTMENT OF COMMERCE AND AGRICULTURE, MELBOURNE.

Spray irrigation.

Bull. Fm Mech. Serv. **13**, 1948, pp. 19, illus.

The components that go to make spray irrigation practicable are discussed and an outline is given of the design, operation and effect of the following systems: fixed sprinklers, portable sprinklers, fixed rotary jets. Figures are quoted showing that the average capital cost of installing portable spray irrigation is £A.30 per acre and the labour for moving piping 2.2 man-hours per acre per irrigation. An automatic system is described which eliminates the need for manual operation of hydrants. This system incorporates a self-cleaning filter, and a self-opening and self-closing valve. Apart from irrigation, the rapid intermittent waterings effected by the automatic spray system have been used to combat frost.

64. NAJJAR, H.

Orchard irrigation. [Arabic. English summary.]

Circ. Ext. Serv. Syrian Minist. nat. Econ., Damascus, **9**, 1947, pp. 26.

Faulty orchard irrigation is causing waste of water and loss of tree growth. Proper furrow and basin systems of irrigation are described.

Growth stimulants.

(See also 73g, 135-137, 160, 321-325, 327, 329, 330, 332, 333, 335-338, 341-343, 347-353, 389, 407, 408, 425, 447, 448, 500, 517, 525d, 692, 701.)

65. TINCKER, M. A. H.

Growth regulators. The use of plant hormones.

Farming, 1948, **11**: 277-81, illus.

The author gives a popular account of the application of plant hormones in agriculture and horticulture, including their use for preventing the pre-harvest drop of fruit, in aiding the rooting of cuttings, in selective

weed-control, in the creation of seedless fruits, and in retarding bud growth.

66. ZIMMERMAN, P. W., AND HITCHCOCK, A. E.
Plant hormones.
Ann. Rev. Biochem., 1948, **17**: 601-26, bibl. 117.

The literature on both the physiological aspects and the practical uses of plant hormones is discussed. The development of equipment for low volume spraying, whereby 5 gall. or less of a spray solution can be dispersed evenly on one acre of land, and the pre-emergence treatment of vegetable crops are described as the two most outstanding recent contributions to weed control.

67. AUDUS, L. J.
Nicotinic acid and the inhibition of growth by auxin.
Nature, 1948, **162**: 811-12, bibl. 2.

The author's experiments with cress seedlings do not support the results of A. W. Galston's (*J. biol. Chem.*, 1947, **169**: 465-6) who, working with excised asparagus tips, suggested that nicotinic acid augments the growth-inhibiting action of β -indoleacetic acid.—University College, Cardiff.

68. WILDMAN, S. G., AND MUIR, R. M.
Observations on the mechanism of auxin formation in plant tissues.
Plant Physiol., 1949, **24**: 84-92, bibl. 11.

Fertilized tobacco ovaries were used as material for an investigation into the origin of free auxin in the plant. It was shown that the rapid production of auxin during ether extraction is probably due to enzymatic conversion of protein tryptophan to auxin, thus supporting the view that tryptophan is a principal precursor of auxin in plants. Several other plant tissues (*Avena* coleoptile tips, tomato stem tips, carrot root and maize coleoptile tips) were shown to produce auxin by the same mechanism. A simple method of estimating auxin content in tissue is described. The tissue is frozen rapidly and dried in a lyophil apparatus, thus inactivating the enzyme; ether extraction is then carried out at 0° C. for periods up to 16 hours. This treatment causes the least possible change in the tissue, and prevents continued auxin production during extraction.—California Institute of Technology, Pasadena.

69. MOSTAFA, M. A., AND NA'IM, M. S.
Stimulation of adventitious root formation by fungal metabolic products.
Nature, 1948, **162**: 575-6.

Unheated filtrates and aqueous solutions of precipitates from *Fusarium lycopersicum* and *F. vasinfectum* culture solutions were found to stimulate adventitious root formation in cut tomato shoots.—Fouad I University, Cairo.

70. GERRITSEN, C. J.
Hoe verkrijgen wij nieuwe en betere rassen ? (How do we get new and better varieties ?)
Tuinbouw, 1948, **3**: 230-3, illus.

On polyploid with reference to the raising of new fruit varieties, with illustrations after M. B. Crane. The advantages and disadvantages of polyploid varieties are summarized as: improved storage qualities, higher vitamin C content, reduced sterility,

better aroma, poorer pollen (only in triploids), and less suitability of the seedlings for rootstocks (only for triploids).

71. KOSTOFF, D.
Atypical growth, abnormal mitosis, polyploidy and chromosome fragmentation induced by hexachlorocyclohexane.
Nature, 1948, **162**: 875-6, bibl. 6.

Insecticidal dusts of the 666 type [concentration not stated] were found to have such a strong influence on the mitosis of seedlings of various crop plants that the chemical may be considered an effective polyploidizing agent. The same is true for the fungicide Granosan, which contains ethyl-mercury-chloride as the active substance. When treating stock seed crops with these chemicals it will be necessary to change the seeds of the varieties to be propagated fairly frequently in order to maintain the pure-line character.—Academy of Sciences, Sofia.

72. YIN, H. C., AND SUN, C. N.
Localization of phosphorylase and of starch formation in seeds.
Plant Physiol., 1949, **24**: 103-10, bibl. 14, illus.

The part played by the enzyme phosphorylase in starch formation is studied, using the soybean, castor bean and broad bean as material.—National Peking University.

Noted.

73.
a BAILEY, I. W. (HARVARD).
Botanical activities at Harvard.
Reprinted from *Rep. President Harvard Coll. and Reps. Departments*, 1946-47, pp. 36.
b BENNETT, E.
Estimation of hemicelluloses in holocellulose from nonwoody plant material.
Analyt. Chem., 1948, **20**: 642-3, bibl. 9.
c BHANDALL, B. S.
Methods and factors that enable a plant to withstand transplanting.
Indian J. agric. Sci., 1947, **17**: 86-93, bibl. 24. A dissertation, not an account of original work.
d V. D. R. COPEMAN, P. R.
Determination of copper and lead in biological material.
Sci. Bull. S. Afr. Dep. Agric. **251**, 1947 (?), pp. 9, bibl. 32.
By chemical analysis, using special organic reagents.
e DENNY, F. E.
The role of the surface micro-flora in measurements of the respiration rate of germinating seeds.
Contr. Boyce Thompson Inst., 1948, **15**: 211-27, bibl. 12, illus.
f FOOD AND AGRICULTURE ORGANIZATION (F.A.O.).
4th Session F.A.O. Conference.
F.A.O. Program of Work for 1949, Wash. 1948, pp. 48.

- g HAMENCE, J. H.
The effect of organic manures on the auxin content of soils and the "auxin balance" in soils.
J. Soc. chem. Ind. Lond., 1948, 67: 277-81, bibl. 4.
- h HENRICI, M.
Effect of excessive water loss and wilting on the life of plants.
Bull. S. Afr. Dep. Agric. 256, being *Bot. Plant path. Series* 6, 1946, pp. 22, bibl. 63 [received 1948].
- i INSTITUTO DI FITOTECNIA.
Nomina del personal tecnico y ayudantes investigaciones que tienen a su cargo. (List of research personnel in the Institute of Phytotechnology of Argentina and their investigations.)
[*Mim. Publ.*] *Minist. Agric. nac. Argentina*, 1948, pp. 5.
- j KRAMER, M., AND SILBERSCHMIDT, K.
Human saliva as a germination inhibitor.
Science, 1948, 108: 410.
- k KRYTHE, J. M., AND WELLENSIEK, S. J.
Five years of colchicine research.
Reprinted from *Bibl. genet.*, 1942, 14: 1-132, bibl. 385 [received 1948].
Contains a subject index of 9½ pages.
- l NOTHACKSBERGER, F.
Grundlagen der Garten- und Grünflächen-gestaltung. (Garden and green belt planning.)
Jb. Hochsch. Bodenk., Wien, 1947, Bd. 1, 1948, 2 (wiss.)Teil, pp. 123-36, illus.

- m RAWITSCHER, F., AND RAWITSCHER, E.
Inadequacy of potometry for measuring plant transpiration.
Nature, 1949, 163: 68-9, bibl. 3.
- n ROSENKRANZ, F.
Die Bedeutung der Phänologie für die Landwirtschaft. (The significance of phenology for agriculture.)
Jb. Hochsch. Bodenk. Wien, 1947, Bd. 1, 1948, 2 (wiss.)Teil, pp. 57-66.
- o SPINKS, J. W. T., AND OTHERS.
Lethal effect of absorbed radioisotopes on plants.
Canad. J. Res., 1948, 26, Sec. C, pp. 249-62, bibl. 10.
- p STOUT, P. R., AND MEAGHER, W. R.
Studies of the molybdenum nutrition of plants with radioactive molybdenum.
Science, 1948, 108: 471-3, bibl. 11, illus.
- q STRZEMIENSKI, K.
Soil phosphate uptake as influenced by phosphatic fertilizer.
Nature, 1948, 162: 932, bibl. 2.
- r WASSINK, E. C.
Photosynthesis.
Ann. Rev. Biochem., 1948, 17: 559-78, bibl. 170.
- s WOODFORD, E. K., AND GREGORY, F. G.
Preliminary results obtained with an apparatus for the study of salt uptake and root respiration of whole plants.
Ann. Bot. Lond., 1948, 12: 335-70, bibl. 29, illus.

TREE FRUITS, DECIDUOUS.

General.

(See also 357, 683, 689, 694, 697, 699, 708, 717, 718.)

74. HUDSON, J. P.
Fruit growing in New Zealand, the land of sunshine.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 75-80.

In this article not only do we get a clear idea of the wide range of fruits grown in New Zealand but we realize, perhaps for the first time, how this fruit is grown. The outstanding feature of commercial fruit growing in New Zealand is the high proportion of holdings worked entirely by the family with but little or no outside labour except for picking. The size of orchard varies, many being less than 5 and only 9 being more than 50 acres, the largest being less than 100 acres. Five to seven acres of really good land should yield an average of 600 bushels of apples per acre, when in full bearing. This could be worked by one man.

75. LAMBERT, D. M.
Fruit growing in the Kenya Highlands.
Ace News-letter, Nov. (?), 1948, pp. 3-5, Ass. Fruit Gr., Essex.

A brief account of a visit in December 1947 to a fruit farm near Molo, Kenya (7,000 to 8,000 ft. a.s.l.) with notes on varieties grown, contour planting, the observed freedom from insect pests, delayed foliation, pruning

and lack of research work. Delayed foliation, it is said, is overcome to some extent by careful choice of varieties and by spraying with 1 : 10 lime-sulphur before bud burst. Of 7 pear varieties grown, Packham's Triumph and Kieffer were the best croppers. The main plum varieties grown are Methley, Santa Rosa, and October Purple. Reference is made to another deciduous fruit area in Kenya near Thompson's Falls. [See *H.A.*, 17: 1733.]

76. LAMBERT, D. M.
Fruit growing in Western Cape Province [S. Africa].
Ace News-letter, Nov. (?), 1948, pp. 5-7, Ass. Fruit Gr., Essex.

Some general information on deciduous fruitgrowing, including brief notes on best areas, apple and pear varieties, rootstocks for apple, insect pests, etc.

77. PALMER, C. D., AND OTHERS.
(U.S.D.A. Bureau of Agricultural Economics.)
Fruits (noncitrus): production, farm disposition, value, and utilization of sales, 1889-1944.
(*Publ.*) *Bur. agric. Econ., U.S.D.A., Wash.*, CS-27, 1948, pp. 106.

This presents U.S.A. statistics for as many years as data are available up to 1944.

78. (REBOUR, H.)

Comptes rendus de l'expérimentation fruitière et de l'activité du Service de l'Arboriculture en Algérie. Années 1945-1946. (Reports on the pomological experiments and activities of the Algerian Arboricultural service in 1945-1946.)

Bull. Serv. Arboric. Algér. **146**, 1948 (?), pp. 52.

An account of the role and programme of the Algerian Arboricultural service together with articles by members of the staff on special subjects, e.g. the use of hormones for obtaining seedless fruits (Blondel, L.); the action of the selective herbicide R.P. (Blondel, L.); notes on fruit varieties in Algeria (Renaud, M.).

79. WEIHENSTEPHAN.

Aus dem Institut für Obstbau der Lehr- und Forschungsanstalt für Gartenbau in Weißenstephan. (Report of the institute for fruit growing at the horticultural college and research station Weißenstephan.)

Gartenbau-Forschung, 1947, Heft 1, pp. 45-75 [received 1948].

The lay-out of the plantations is described and an account is given of the long-term trials with pome and stone fruit rootstocks and stem-builders in progress at Weißenstephan. In another experiment the advantages and disadvantages of different tree shapes are compared. In addition, a number of minor projects are discussed.

80. BARKER, B. T. P.

Science and cider making.

Brit. Sci. News, 1948, 2: 11-16.

The cider industry in England has reached a turning point. The older orchards are dying out and there is no succession of young trees to maintain the continuity. On the other hand, the demand for cider is increasing. The only apparent way of overcoming the impending fruit shortage is to establish orchards of bush trees of superior varieties which will be in full bearing within 10 years of planting. A list of some 30 varieties, most suitable from both the orchard and vintage point of view, has been drawn up as a result of 45 years of systematic trials. It is anticipated that the bush tree plantations recommended will call for growers specializing in cider apples, and that the old type of apple orchard on West Country farms is going to disappear in time. The author, in a well-illustrated article, discusses the latest methods of expressing the juice, the fermentation process, blending to obtain the most favourable balance of flavour constituents, the storage of the fermented liquor and its disorders, and pomace as a valuable by-product.

81. SAMISCH, R. M.

Plum growing in the Jewish settlements of Palestine.

Bull. agric. Res. Stat., Rehovot, **50**, 1948, pp. 82, bibl. 40, illus.

The results are reported of a survey of plum growing in Palestine; certain practices are criticized and suggestions made. The primary limiting horticultural factor is shown to be the climate. Warm winters fail to break winter rest sufficiently, but the amount of chilling requirement differs with different varieties.

Chilling requirement will govern the choice of varieties to be planted, only those with light rest requirements being suitable. While local yields of climatically adapted varieties are satisfactory, compared with those in other countries, tree vigour needs to be improved in some varieties and localities. This is evidenced by: (a) early decline; (b) limited bearing surface; (c) attacks by borers. Increased planting distances would seem desirable. Improvements have been suggested in the practices of manuring and fruit thinning. Furthermore, the selection and introduction of additional rootstocks are no less important for improving the vigour and uniformity of plum orchards. Tests should be made of cold storage possibilities for early varieties which may be suitable for export, and late varieties for the local holiday market. Prune varieties suitable for drying and preserving should be introduced. It would seem desirable to discourage plum growing in the plains.

82. LENANDER, S. E.

Körsbärsodling—erfarenheter från inhemska och utländska försök. (Cherry growing—Results obtained in Swedish and foreign experiments.)

Reprinted from *Svensk Jordbruksforskning*, 1948, pp. 15, bibl. 25, as *Trädgårdsförs. Särtrycksserie* 11.

A discussion of the literature on bacterial canker, the raising and pruning of cherry trees, cultivation, manuring and liming rootstocks, flowering and pollination.

83. KUHLMAN, G. W., AND MUMFORD, D. C.

Cost of producing sweet cherries for processing in the Willamette Valley and the Dalles Area [U.S.A.].

Stat. Bull. Ore. agric. Exp. Stat. **454**, 1948, pp. 48, illus.

The cost of producing sweet cherries (for processing) in 1946, with the yield averaging 4,839 pounds per acre, was \$8.33 per hundred pounds.

84. K., G.

Öl aus Kirschkernen. (Oil from cherry stones.)

Ceres, Hamburg, 1948, 1: 7/8: 25.

According to a reliable source, a high-quality edible oil has been produced from cherry stones in Baden, i.e. in south-western Germany. Oil yield is reported to be 15-20% of the stones crushed.

85. GRIFFIN, Z. R.

A year in the Bradbourne fruit gardens at East Malling Research Station.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 50-9.

Plans of the walled garden and of the demonstration gardens are given, and the work throughout a year, September to August, is chronologically reviewed.

86. TAYLOR, H. V.

Modern methods of apple production.

Farming, 1948, 2: 343-6, illus.

An article giving practical advice to the grower, emphasizing the changes that have come about in apple growing in England within the past two or three decades.

87. HITCHINS, P. E. N.

Going back to peach growing under glass.

Grower, 1948, 30: 98-100, illus.

An account of the cultivation of peaches under glass. The variety now preferred is Duke of York worked on East Malling Common Mussel or Pershore. Manuring, thinning and grading are described.

88. LAJE, L. J.

El cultivo de la higuera en la zona de Villa Dolores (Prov. de Córdoba). (Fig culture in the Villa Dolores zone of Córdoba province.)

Rev. mens. B.A.P., 1948, 31: 368: 82-3.

Because of its deep soil, good drainage and dry climate the Villa Dolores region is unsurpassed for the production of figs for drying. Notes are given on propagation, pruning, irrigation, harvesting, sulphuring (for certain varieties such as Kadota and Adriatico), and packing for market.

89. TARRAGO, E.

La morera blanca. Instrucciones para su cultivo. (Instructions for cultivating the white mulberry.)

Rev. mens. B.A.P., 1948, 31: 369: 74, 76-80, illus.

The botanical characters of the white mulberry (*Morus alba*), grown for its foliage to feed silkworms, are briefly mentioned. The great variation shown by seedlings is pointed out, and the selection and propagation by budding of the most suitable varieties are indicated. The chief varieties are described, with illustrations to show differences in leaf size and shape.

90. NAJJAR, H.

Olives. How to make them bear annually.

[Arabic. English summary 1 p.]

Circ. Ext. Ser. Syrian Minist. nat. Econ., Damascus, 15, 1948, pp. 17, illus.

Olives have a strong tendency to biennial bearing. Because of its habit of bearing fruit on the previous year's growth, the tree, under poor management, cannot in one season bear fruit and at the same time produce enough twig growth for annual bearing. Advice is given for breaking alternate bearing, viz.: cultivate to destroy weeds and avoid loss of moisture; apply manures (nitrates and superphosphate recommended) to root zone, not near stem; carry out rejuvenation pruning on old trees, and regular pruning every second year; in summer irrigation use 3 or more furrows between rows, instead of one wide furrow along the trees in a row; avoid breaking branches when harvesting the fruit.

Breeding and varieties.

(See also 690, 704.)

91. SCHMIDT, M.

Beiträge zur Züchtungsforschung beim Apfel. 1. Phaenologische, morphologische und genetische Studien an Nachkommenschaften von Kultursorten. (Breeding investigations with apples. 1. Phenological, morphological and genetical studies of the progenies of varieties.)

Züchter, 1947, 17/18: 161-224, bibl. 35 [received 1949].

In a survey of his own results and those reported by

other workers the author comes to the conclusion that inheritance in apple is not governed by simple Mendelian laws. A further complication is that bud sports are, in general, sterile in crosses among themselves and with the original variety. With certain reservations it can be stated that the following characters are transmitted by polymeric, cumulative genes: Beginning of flowering, duration of flowering, beginning of maturity, keeping quality, fruit shape, fruit size, fruit weight, and fruit colour. In a discussion of the suitability of a number of varieties for use as parents the value of "Geheimrat Dr. Oldenburg" as a source of earliness and large fruit size is pointed out. In several cases the author has been successful in combining earliness with high quality. While the present investigations were based on seedling material originally collected for other purposes, it is hoped that the author's own seedlings will shortly come into bearing and will then allow an even more productive study of apple genetics.—Zentral Forschungsanstalt für Pflanzenzucht [Erwin Baur-Institut], Müncheberg, Mark, Germany.

92. PASSECKER, F.

Vermehrungs- und Züchtungsfragen bei der Aprikose. (Problems of reproduction and breeding in the apricot.)

Züchter, 1947, 17/18: 277-84, bibl. 27 [received 1949].

The following is a slightly abridged translation of the author's summary: (1) Of the apricot rootstocks common in Germany seedlings of apricot and of certain types of *Prunus domestica* make for long-lived trees, while trees on myrobalan are usually short-lived. (2) Apricot seedlings should preferably be raised from small-fruited types. (3) Rapid methods have been evolved for testing the germination capacity of apricot stones. (4) The raising of apricot rootstock material can be suitably achieved by soft wood cuttings and layering. Plum rootstocks may, further, be propagated by suckers and root cuttings. (5) *Prunus domestica* and other plum rootstocks are better grafted than budded. (6) The best way of producing resistant trees is top working. The use of stem builders is discouraged. (7) Trees on their own roots may be obtained by soft wood cuttings and layers, where shoots of the juvenile form are available. It is possible to breed varieties which preserve their juvenile form and thus remain capable of being propagated by cuttings and layers. (8) Aims in the breeding of apricot varieties and rootstocks are discussed. (9) The European apricots are almost exclusively *Armeniaca vulgaris* varieties, while most of the Asiatic varieties are derived from other *Armeniaca* spp. and from some species hybrids. (10) Most apricot varieties are self-fertile. (11) The apricot shows juvenile, mature and transition forms. Shoots of the juvenile form are characterized by their great rooting capacity. Cultivated varieties always show the character of the mature form.—Hochschule f. Bodenkultur, Vienna.

93. REBOUR, H.

Variétés fruitières à cultiver en Algérie. (Fruit varieties for cultivation in Algeria.)

Bull. Serv. Arboric. Algér. 141, 1948 (?), pp. 15.

The author enunciates the principles underlying choice

of variety (flavour, saleability, adaptation to local conditions, fertility, resistance to fruit fly), and then gives the outstanding characters of varieties of apricot, citrus, almond, cherry, quince, fig, kaki, loquat, olive, pecan, peach, pear, apple, Japanese plum, European plum, and table grapes suitable for cultivation in Algeria, mentioning varieties to be avoided.

94. LAL, G., AND JAIN, N. L.

Canning trials on fruits.

Indian J. agric. Sci., 1947, 17: 187-95, bibl. 14.

An account of canning trials at the Fruit Products Laboratories, Lyallpur, with commercial varieties of plum, peach, apricot, and pear grown in the United Provinces, Kashmir, and Punjab. The following were found to can well. Plum: Alubukhara (large), Ladak, Howe, Kelsey's Japan, Satsuma, Yellow Prune, Chabot, Merripasa. Peach: Quetta and Fitzgerald. Apricot: Charmagaz. Pear: Williams.

95. BLASER, H. W., AND EINSET, J.

Leaf development in six periclinal chromosomal chimeras of apple varieties.

Amer. J. Bot., 1948, 35: 473-82, bibl. 43, illus.

Sports from the five diploid apple varieties Northern Spy, Ontario, Wealthy, Jonathan and Rome are studied cytologically to determine the variation in origin and distribution of diploid and tetraploid tissues. The results are used to show the contribution made by each layer of cells in the shoot apex to the production of stems and leaves.

96. SHAND, P. M.

Russet apples.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 25-33.

The Oxford English Dictionary's definition "a variety of eating apple, of a reddish or yellowish brown colour, or marked with brownish spots and having a rough skin", merely, as the author says, adds to the confusion. The term, he points out, implies to some a rough-skinned, dull-coloured apple; to others the possession of a particular flavour. In any case greater clarity is desirable. The author makes a start by the compilation of three lists, the first (34) a copy of those termed "russet" by Hogg in his final edition of the *Fruit Manual*, the second (17) comprising additions to the above by the author, and the third (a further 60) described as of superior quality by Hogg, but not having "russet" in their names, though more or less completely mottled by russetting.

97. ANON.

New apple.

Farming, 1948, 11: 285.

A short note on Russell Red, a blood-red sport of Geeveston Fanny discovered by William Russell of Tasmania.

98. POTTER, J. M. S.

Pears.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 20-4.

Useful notes on the requirements for cultivation in England, of varieties of pear recommended for general planting and varieties recommended for quality.

Among the latter the author considers that Laxton's Superb and Williams should succeed out of doors in most parts of the country, that Doyenné du Comice, Beurré Superfin, Marie Louise, Seckle, Thompson's, Belle Guerandaise and Josephine de Malines are likely to succeed only in the warmer districts, and that Passe Crasanne, Olivier de Serres, and Bergamotte d'Esperen need the added protection of a warm wall.

99. GRAVES, G.

The beach plum [*Prunus maritima*].

Amer. Nurseryman, 1948, 88: 7: 15-16.

Little progress has been made in selecting desirable clones of the small beach-plum for cultivation in the United States. The best fruit from wild plants is quite suitable for processing; a regular and sufficient supply is required, and it is suggested that selection should be based on regular fruiting and late flowering to avoid poor setting. Six selections that bear edible fruit are being tested. Vegetative propagation is described.

100. MORETTINI, A.

I peschi ed i susini d'incrocio "Morettini".

(Morettini's new peach and plum varieties.)

Riv. Ortofrutt. ital., 1948, 32: 109-22.

A description of the characters of 12 peach varieties, in many of which J. M. Hale was one of the parents, and of 2 plum varieties Florenzia × Beauty N.355 and Shiro × Santa Rosa N.243.

101. DIMITRI, M. J., AND MILANO, V. A.

Una interesante variedad de duraznero cuyo cultivo debe difundirse. (An interesting peach variety worth growing more widely.)

Rev. argent. Agron., 1948, 15: 212.

A note on the weeping or pendulous peach; it is both ornamental and fruitful, and the fruit is of good quality. The weeping habit is inherited, and the natural bending of the branches favours the production of fruiting buds.

102. ANON.

A new early peach.

Amer. Fruit Gr., 1948, 68: 8: 21.

The new Starking Delicious variety, a bud sport of Burbank July Elberta, is a yellow-fleshed freestone peach, which matures more than a week earlier than Redhaven. It is described as excellent for freezing and home canning.

103. GERRITSEN, C. J.

Verwarring in enkele kersenrassen. (Confusion in certain cherry varieties.)

Fruiteelt, 1948, 38: 672.

The confusion in the nomenclature of cherry varieties is pointed out with particular reference to the groups Früheste der Mark, Kassins Frühe, and Early Rivers.

104. v. SCHELHORN, M.

Über eine triploide Vogelkirsche. (A triploid bird cherry.)

Züchter, 1947, 17/18: 232-5, bibl. 8 [received 1949].

The cytological examination of an exceptionally vigorous mazzard seedling, the Theissinger Sämling, showed the tree to be a triploid. In contrast to the few triploid *Prunus avium* plants described by Darlington and others, it has morphologically a pure sweet cherry

character. The significance of the plant for breeding as a source of vigour and good fruit development is discussed.

Propagation and rootstocks.

(See also 70, 73c, k, 79, 92.)

105. RENOUE, L. R.

Budding of fruit trees in spring.

N.Z. J. Agric., 1948 77: 160.

A description with drawings of the plate or dry budding method which enables fruit trees to be budded in spring (September and October in New Zealand) instead of in late summer or autumn. The risk of buds being killed by frost or winter conditions is thus eliminated and the method is particularly applicable to certain areas in the South Island. In trials in the Alexandra district spring plate budding was successful for apricot on peach, plum, and apricot stocks, peach on peach stock, plum on plum stock, and apple on apple stock.

106. VAN GILS, G. E.

Rubber als bindmateriaal bij het enten.

(The use of rubber ties in grafting.)

Chron. Nat., 1948, 104: 76-7.

"Attention is drawn to the possibility of using thin rubber strips as binding material for grafting." The following advantages are put forward. (1) The elasticity prevents any danger of bruising. (2) The waterproof covering prevents rotting at the union due to entry of rain water. (3) Rubber gradually perishes, so there is no need to cut the ties. (4) The thickness of the strips can be chosen to suit the graft. The manufacture of the rubber sheets is described.

107. HÜLSMANN, B.

Selektion von Obstunterlagen. (The selection of fruit tree rootstocks.)

Züchter, 1947, 17/18: 224-32, bibl. 6 [received 1949].

This is the first detailed account of the seedling rootstock selection work carried out at Berlin-Dahlem since 1931, the report taking us to May 1944. It has been the object of these large-scale trials, in which tens of thousands of seedlings were planted out in stool beds or layered, to find improved rootstocks for different varieties of apple, pear, plum and cherry in different localities. All rooted shoots were stooled again for further propagation. In the first stage of the trial all plants with a poor rooting capacity were eliminated, then the selected plants were worked with 5 varieties and their behaviour in the nursery was observed. Finally, yield records are to be taken in plantings in different parts of the country, where the trees will be grown under commercial conditions. The present paper covers the first stage only, giving detailed figures for each kind of rootstock of the percentage of clones selected for further investigation from the original material. These figures may be summarized as follows: Apple, 2.7%; pear, 0.5%; *Prunus avium*, 1.8%; *Prunus mahaleb*, 1.3%; plum, 1.9%.

108. BEAKBANE, A. B., AND THOMPSON, E. C.

Exploration for fruit-tree rootstocks.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 14-19, 8s. 6d.

An account of the progress in a short term project which was to examine wild and naturalized *Prunus* species and to select from them certain specimens which could be raised vegetatively and used at once as rootstocks. Work in Cambridgeshire and Worcestershire in the years 1944-1947 is described and is followed by an account of an expedition to France in 1948, which roughly covered nurseries and orchards in the valleys of the Loire and Lot, certain forests in the Loire valley, and the slopes of the Western Pyrenees in the valleys of the Aspe and Ossau. From their observations the authors conclude that the lower slopes of the Pyrenees are probably good sources of *Prunus* species. On the route followed in France *Prunus* seems to occur wherever the soil contains sufficient lime in available form, e.g. in the river valleys and on the slopes where erosion has exposed calcareous rocks. They consider that other regions such as South-Eastern Europe and the Middle East merit future expeditions for a similar purpose.

109. MINISTRY OF AGRICULTURE, LONDON.

Rootstocks for apples and pears.

Advis. Leaf. N.A.A.S. 335, 1948, pp. 4, 1d.

A short explanation of the main considerations governing the choice of rootstocks in Britain is followed by descriptions of the Malling apple-rootstocks, and some rootstocks for pears.

110. KARNATZ, H.

Möglichkeiten der Saatgutgewinnung im Obstbau. (Fruit seed production for the raising of rootstocks in Germany.)

Ceres, Hamburg, 1948, 1: 7/8: 9-11.

Annual seedling rootstock requirements in Germany are estimated as follows: apple, 8 million; pear, 2.8 m.; cherry, 4.5 m.; plum, 4.4 m. Stone fruit plantations especially have been decimated by frost so that large numbers of young trees are needed to make up for the losses. Sufficient seed can be procured by import only. With apples, too, Germany remains dependent on seedling rootstocks, clonal rootstock beds having suffered severely from frost. The country should be able to produce the necessary seed itself. Selection of suitable varieties and methods of seed extraction are discussed for stone and pome fruit kinds.

111. UPSHALL, W. H.

Malling stocks and French crab seedlings as stocks for five varieties of apples. IV.

Sci. Agric., 1948, 28: 454-60, bibl. 4.

Five varieties, R. I. Greening, Melba, Delicious, Spy, and McIntosh, propagated on French Crab seedlings, Malling XVI, I, II and IX were planted in the fall of 1929. Except for the Melba variety, all trees on Malling II were removed in 1942. This report on the orchard brings the results together for the period up to the end of the eighteenth year. Trees on the clonal Malling XVI and Malling I rootstocks have proved as variable, or more so, in growth and production as trees on French Crab seedlings. One must look, therefore, to other reasons for using them. Of the five varieties in the orchard only McIntosh looked markedly superior on Malling XVI. On this stock the trees were very uniform, in both growth and yield, and very productive for their size, bearing fruits of good size

and superior colour. In Massachusetts, McIntosh on Malling XVI has been a good combination. Malling I cannot be recommended for R. I. Greening and Delicious owing to possible breakage at the union and poor anchorage, respectively. It has not been favourably received in either Pennsylvania or West Virginia. At Vineland it seems to have some merit for Melba, Spy, and McIntosh, where a somewhat smaller than standard tree is wanted. However, because of its behaviour with some other scion varieties the trees should not be planted in windy locations, except as small trial plantings. [From author's summary and discussion.] —Hort. Exp. Stat., Vineland, Ontario. (See also *H.A.*, 13: 1165.)

112. SHAH, S. M. I.

How to raise peach trees [in N.W.F.P., India].

Ind. Fmg., 1946, 8: 584-5 [received 1948].

Peach and plum are grown only on peach stocks in the N.W. Frontier Province. A large percentage of the apricots grown are also budded on peach. Budding and after treatment are described.

Pollination.

113. MOMMERS, J.

De plaatsvastheid der honingbijen. (The confined visiting habits of honeybees.) [English summary 10 l.]

Meded. Direct. Tuinb., 1948, 11: 529-39, bibl. 10.

Literature on the instinctive habit of worker-bees to confine their visits to limited but fixed areas is reviewed. New observations by P. Stadhouders and by the author on bees visiting apple trees in bloom (Jonathan, Cox's Orange Pippin and Golden Delicious) confirm the work of others. It was also found that when the distance between trees in the row is less than the distance between rows, the bees fly more along the row than from one row to another. To assist pollination it is therefore advisable to plant the pollinizers in the rows between the trees of the main variety. Cross pollination is mainly effected at the beginning of blossoming.

114. DIJKXHOORN, R.

Kaspruimen en hun bestuivers. (Greenhouse plums and their pollinizers.)

Fruitteelt, 1948, 38: 644-5.

The plum varieties grown under glass in Holland are briefly described, their qualities as pollinators being pointed out. Attention is drawn to a new variety, Red June, and its good and bad qualities are noted. It requires more drastic fruit thinning than June Blood, but if the thinning is thorough it produces more flowers and thus more pollen than June Blood. If the thinning is unsatisfactory the trees may have no blossom the next year.

115. CROCE, F. M.

La caprificacion de la higuera. (The caprification of the fig.)

Rev. mens. B.A.P., 1948, 31: 367: 55-6, 59, 67-71.

The author begins with a brief history of caprification and then describes the three types of fig flowers (staminate, pistillate, and those containing the pollinating

wasp, *Blastophaga grossorum* Grav.). He classifies figs as (a) capri, (b) common, (c) San Pedro, and (d) Smyrna, and describes these four types. The biology of the *Blastophaga* is given in detail.

116. WHIFFEN, H. J.

Bees in the orchard. Facts and figures after using hives for the first time.

Fruitgrower, 1948, 106: 573-5, 4 figs.

Yield figures for apples and plums are quoted from which is argued the importance of having: sufficient shelter from N. and E. winds, sufficient pollinator trees correctly spaced, and a correct distribution of beehives.

117. MINISTRY OF AGRICULTURE, LONDON.

The importance of bees in orchards.

Advis. Leaflet. Minist. Agric. Lond. 328, 1948, pp. 3, 1d.

The subject is briefly dealt with under: suitability of available insects, arrangement of hives in orchards, the need for competition, determining the number of colonies required, protection of bees against poisonous sprays and dusts, hiring bees for orchard pollination.

118. MEDICI, M.

Contribucion al estudio de la flora apicola de la Republica Argentina. (A contribution to the study of bee flowers in Argentina.)

Rev. mens. B.A.P., 1948, 31: 368: 25-7, 49-50, illus.

A general account of the substances (nectar, pollen, bee-glue, honeydew) gathered by bees from flowers, with reference to the chief plants visited by bees in Argentina. Some of these plants are illustrated.

119. PALMER-JONES, T., AND OTHERS.

A recent outbreak of honey poisoning.

N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp. 107-43.

An article in six parts by different authors describing various aspects of the problem. The results of the work so far carried out suggest that toxic honey is secured not from a floral source but from a honey-dew excreted by a hopper, *Scolypopa australis*, while feeding on the sap of tutu plants (*Coriaria arborea*).

Growth.

120. JENSEN, G.

Hvor hurtigt vokser æbler? (The rate of apple growth.)

Erhvervsfrugtavl., 1948, 14: 287-9.

Measurements were made of apple fruit growth at 6-day intervals from 10th August to 3rd September, 1947, the volume of the fruits on the tree being determined by the water displacement method. During this period the volume of Cox's Orange increased from 47.4 c.c. to 86.9 c.c. (mean of 10 fruits).

121. LUGEON, A. R.

Fasciation sur une pomme. (Fasciation in an apple.)

Rev. hort. suisse, 1948, 21: 298.

A fasciated fruit of the apple, Reine des Reinettes, is illustrated and briefly described. It was borne by a fan-shaped peduncle on a perfectly normal branch. The flat seeds indicate that fasciation extended to the internal parts.

122. SINGH, L. B.
Studies in biennial bearing. II. A review of the literature. III. Growth studies in "on" and "off" year trees.
J. hort. Sci., 1948, **24**: 45-65, 123-48, bibl. 133, 6 plates.
II. The serious problem of biennial bearing still remains largely unsolved, and is likely to remain so until the fundamental causes are more fully understood. Previous studies on single aspects, e.g. tree vigour, spur growth or chemical composition of spurs, fail to give a clear picture of the whole phenomenon. A comprehensive study of all the growth characters under the same environmental conditions is needed. Many attempts have been made to control biennial bearing by various treatments with conflicting results, e.g. some investigators have reported positive results with fruit thinning, others negative. The same is true of manuring and defoliation experiments. Of all the methods tried, blossom thinning seems to have yielded the most consistent results so far, but biennial bearing would appear to be the result not of one but of many factors.
III. A series of intensive studies of the shoot, trunk, spur and leaf development of the typically "biennial" bearing apple variety Miller's Seedling and studies on several other regular and biennial bearing varieties have been carried out. A strong negative correlation between heavy cropping (i.e. "on" year condition) and trunk thickening in Miller's Seedling was found. In Lane's Prince Albert a negative relationship between heavy cropping and root growth was established. No significant differences in shoot growth between trees of Miller's Seedling in normal "on" and "off" year condition were shown; but it was found that in trees which were artificially put into the "off" year condition by de-blossoming in the year following a normal "off" year, significantly more shoot growth was produced. The extension shoots of "on" year trees start growing sooner and grow faster than those of "off" year trees during the critical period of fruit bud formation (i.e. May and June). This may affect the differentiation of fruit buds in biennial bearing trees. Studies of leaf number and area, throughout the season, on the spurs of "on" and "off" year trees showed that the leaf area per spur of "off" year trees was nearly double that of "on" year trees during the critical period of fruit bud formation. This is considered of great significance. Records of individual spur behaviour showed that, in Miller's Seedling, 80% of the spurs blossomed, all together, in alternate years only, and the rest remained vegetative. Thus the biennial habit in this variety is due to lack of blossom production in alternate years, not to lack of setting of blossoms that are produced. In Miller's Seedling the bourse buds (secondary buds which form below fruiting clusters) fail to differentiate into fruit buds. This is the main cause of the biennial behaviour of this variety and would appear to be due to lack of leaf surface at the critical period. A comparative study of spur behaviour of two "regular" varieties (Ellison's Orange and Ribston Pippin) and two "biennial" ones (Miller's Seedling and Blenheim Orange) showed that, while Miller's Seedling behaved as described above, Ellison's Orange and Ribston Pippin both produced blossoms regularly each year on more than 70% of their spurs, and a high proportion of these also set fruits each year. Blenheim Orange, however, differed from the rest, for not only did all of its spurs fail to blossom in alternate years, but also even in the "on" years only 50% of its spurs blossomed, and relatively few of these set fruits. Thus this variety, besides being biennial in bearing, is a shy cropper. A study of leaf colour and leaf scorching (mainly marginal scorch) showed that "on" year trees had darker green leaves than "off" year ones, towards the end of August. Leaf scorching was more severe in "on" year trees than in "off" year ones. [From author's conclusions and summary.]—E. Malling Res. Stat., Kent. (See *H.A.*, 6: 268.)
123. VITTORIA, A.
L'epoca di differenziamento del talamo in *Prunus domestica* L. ricercata in base agli ulteriori sviluppi della teoria di Delpino-Catalano. (The time of differentiation of the receptacle in *Prunus domestica* L. in relation to the further elaboration of the Delpino-Catalano theory.)
Ann. Fac. Agrar. Portici, 1948, **16**: 151-67, bibl. 27, illus.
The author describes the structure and initiation of the receptacle in the plum. He finds that in the development of the receptacle phyllopodia are differentiated basipetally. In 1945, at Portici, the flower buds of the plum Santa Rosa were first differentiated on 16 May.
124. YANKOVITCH, L., AND BERTHELOT, P.
Enracinement de l'olivier et des autres arbres fruitiers dans la sud de la Tunisie. (The root systems of the olive and other fruit trees in southern Tunisia.)
C.R. Acad. Agric. Fr., 1948, **34**: 774-6.
Olive root systems were investigated by exposing them and tracing the roots to their extremities. The olive has no tap root and roots in the deep layers of soil are relatively small (2-3 cm. diameter), growing downwards from the horizontal roots, often to a depth of 4 metres and in favourable soils 6 metres or more. The nature of the surface soil is of great importance in choosing sites for olives in Tunisia because of the low rainfall of 200-300 mm. (8-12 in.), but the trees make good use of the subsoil. The calcareous soils so abundant in Tunisia are suitable, provided that there is a suitable subsoil. Brief notes are given on the rooting of the almond and the fig.

Training and pruning.
125. DENHAM, H.
Apricots: some informal notes.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 86-91.
Training, pruning and other cultural practices in an English wall garden.
126. BEAKBANE, A. B., AND THOMPSON, E. C.
Contre-espaliers and other trained fruit trees in France.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 34-7.
SWITHINBANK, D. J.
Tying in the shoots of trained fruit trees.
Ibid., pp. 38-42.

In the first of these articles the authors illustrate and discuss the use of the following systems of training apples and pears:—Cordon Ferraguti, Palmette Verrier, Palmette Oblique, Winged Pyramid, Losange and Arcure. In the second, very practical hints are given, which should greatly facilitate [the tying in of shoots when training shoots of specially trained trees.

Other cultural operations.

(See also 58-64.)

127. TEICHMAN, W. W.

Building strong trees. The story of the side-leader method of training fruit trees.

Amer. Fruit Gr., 1948, 68: 10: 12-13, 23, 26.

When planting a young peach orchard on high ground in 1927 the author, a Michigan grower, discovered by accident that trees pruned to one side branch, leaning with prevailing winds, had great advantages over open-centre and central-leader types. Extensive observations and comparisons during the last 20 years confirmed him in his view. One strong lateral having been selected in the first year, three scaffold branches on the side leader are selected in the second winter. In subsequent pruning the lower scaffolds are subdued so that the terminal branch retains its lead. It was found that the knot-like head and wide-angled crotches resulting from this treatment make for especially long-lived trees resistant to wind breakage, frost and insect damage. A slightly modified system was applied to cherries and apples with equal success. All lateral branches were removed from the weather side of the tree, only 2-3 of the best lower branches being retained on the opposite side. Again the trees were planted with the leader pointing away from the prevailing wind direction, inclined leeward at an angle of about 30°. The side leader has to be maintained by counteracting the trees' tendency to produce branches to leeward on their bare sides. Not more than 3 scaffold branches are allowed to develop and secondary scaffolds are formed at properly spaced intervals. It takes at least 3 years to train a peach tree and 5 or more years to shape an apple or cherry tree. The advantages of this method of training for the management of the orchard are discussed.

128. NAJJAR, H.

Pruning the olive tree. [Arabic. English summary ½ p.]

Circ. Ext. Ser. Syrian Minist. nat. Econ., Damascus, 14, 1947, pp. 15.

Pruning of olives is not a uniform practice in Syria. Farmers are advised: to prune regularly every second year to remove weak and crowded twigs; to prune young trees lightly; to rejuvenate old trees by removing old, long branches and dead twigs; to prune in winter so as to thin the succeeding crop and encourage fresh growth.

129. CROCE, F. M.

Poda del nispero japonés. (Pruning the loquat.)

Rev. mens. B.A.P., 1948, 31: 369: 32-3.

The loquat tree, its habit of growth in Argentina, foliage, flowers and fruit are described, and notes are given on shaping the young tree, and later pruning when the tree has come into fruit.

130. MINISTRY OF AGRICULTURE, LONDON.

Orchard renovation.

Advis. Leaflet N.A.A.S. 333, 1948, pp. 5, 1d.

The subject is dealt with under: prospects for renovation, the overcrowded orchard, pruning, spraying, cultivation, manuring, grass improvement, drainage, and orchard gaps.

131. ANON.

"Iron Monkey" replaces ladders.

Better Fruit, 1948, 43: 2: 10, 13, 22.

A "multiple platform fruit tree machine" is described and illustrated by several photographs. It has been used with great success for thinning, harvesting and pruning in deciduous fruit and citrus orchards. The machine has 4 individually-controlled catwalks, which can be raised, lowered or swung round by pressing a button. The present model is towed by a tractor, but plans are under way to make it self-propelled.

132. HOUTER, K. G.

Het verplanten van grote vruchtbomen.

(Transplanting large fruit trees.)

Fruittelt, 1948, 38: 656-8.

The author discusses measures to be adopted in transplanting large fruit trees (4 to 40 years old), with reference to the soil, weather, manuring, and the precautions that must be taken at the time of the operation. It is pointed out that special care must be taken with trees on EM. IX rootstock because of its brittle roots.

133. SHEAR, G. M.

The effect of nutrition on the chemical composition of Winesap apple foliage.

Tech. Bull. Va agric. Exp. Stat. 106, 1947, pp. 15, bibl. 16.

The trials took place in the years 1940-1944 in a loam soil with a pH which varied in 1940 from 5.65 to 6.10. The orchards were under sod, the trees 25 or 35 years old in 1940. The fertilizers used were sodium nitrate, 20% phosphate and potassium chloride, the P and K being sometimes broadcast, sometimes placed in holes. The differences in leaf composition at different times and following different treatments are discussed. There are indications that the optimum nitrogen level in the foliage of Winesap leaves is about 1.8% or more in the leaves collected in September. A P_2O_5 content of about 0.5% and a K content of 1.1% at that time appears to be adequate. Under conditions of the experiment N applications are found to be necessary but not K and P applications, unless the levels in the leaves fall below the amounts stated above.

134. LOEWEL, E. L., AND MAUCH, A.

Erfolgreiche Bodenbearbeitung im Obstbau.

(Soil cultivation in orchards.)

Ceres, Hamburg, 1948, 1: 7/8: 21-2, illus.

A method of harnessing a horse or a tractor at the side of an implement has been developed which allows soil cultivation to be carried out in orchards right up to the trees under branches as low as 27 in. Branches hanging to the ground are lifted without damage by a gliding plane, attached to the implement. The track of the horse or tractor runs 3-10 ft. to the side of that

of the cultivator, according to the size of the trees.—
Jork fruit experiment station, Germany.

135. POWWER, A.
"Late val" en groeistoffen. (Pre-harvest
drop and growth substances.)
Fruiteelt, 1948, 38: 550-1.

This article gives a historical outline of the application
of growth substances to prevent pre-harvest fruit drop,
with a short account of the abscission process and of
the substances tested to delay drop. A list is given of
13 apple and 5 pear varieties on which good results
have been obtained in Holland.

136. LUCKWILL, L. C.
The hormone content of the seed in relation
to endosperm development and fruit drop in
the apple.

J. hort. Sci., 1948, 24: 32-44, bibl. 11, illus.

Previous work had shown that it was possible to extract
from apple seeds at certain stages of development a
hormone which was active in stimulating parthenocarp
in the tomato. Using a hot-water extraction technique
and a quantitative form of the tomato ovary test,
measurements were made of the quantity and the
concentration of this hormone in the seed of the apple
variety Beauty of Bath at approximately weekly
intervals from petal-fall to fruit ripening. The
hormone first appeared in the seed in large quantities
30 days after petal-fall, its appearance coinciding with
the formation of the endosperm and with the cessation
of the post-blossom drop. Following endosperm
formation there was a period of rapid embryo growth,
during which the hormone content showed a temporary
reduction, rising again to its maximum level 75 days
after petal-fall, when the embryo had attained its full
size. In the final stages of fruit growth there was a
rapid fall in the hormone content of the seed, which
appeared to be correlated with the degeneration of the
endosperm and the occurrence of the pre-harvest drop.
In Cox's Orange Pippin the hormone content of seeds
from "June drop" fruits was 45% of that from
picked fruits. In Miller's Seedling it was only 27%.
In addition, the dropped fruits had fewer seeds on the
average than had the picked fruits. The highest
concentrations of hormone were found in the outer
layers of the seed and it is concluded from this and
other evidence that the hormone originates in the
endosperm. This hormone appears to play no direct
part in stimulating the growth of the fruit, and its
chief function is thought to be the control of fruit
abscission. It is shown to be active in delaying the
abscission of shortened petioles of ivy. The glucoside
phloridzin was found in large quantities in the outer
layers of the seed and is probably present both in the
nucellus and in the endosperm. Its function appears
to be that of a reserve food material. [Author's
summary.]—Long Ashton Res. Stat., Bristol.

137. CRANE, J. C., AND BLONDEAU, R.
The use of growth-regulating chemicals to
induce parthenocarpic fruit in the Calimyrna fig.
Plant Physiol., 1949, 24: 44-53, bibl. 16, illus.

Many fig varieties are parthenocarpic, but the Cali-
myrna fig, the leading drying variety in California,
requires caprification. This is a costly, uncertain, and
potentially disease-spreading operation, the elimination
of which would be of great benefit to the grower.

Investigations were carried out to determine whether
parthenocarpic fruit could be induced in this variety
by the use of growth-regulating substances. Three
substances were tried: 2,4-D, β -naphthoxyacetic acid,
and γ (indole-3)-n-butyric acid. They were applied as
aqueous injections, and as oil-based and aqueous
sprays. Injection produced no parthenocarpic develop-
ment, neither did the sprays of 2,4-D or naphthoxy-
acetic acid, at the concentrations used. Applications
of indolebutyric acid, however, both in aqueous and
oil-based solutions, produced parthenocarpic fruit set
equal to, or better than, the caprified controls. One
well-timed application could give almost complete
fruit set. Splitting of the fruit just before ripening is
a serious problem of normal Calimyrna fig production,
but this does not occur when the fruit develops
parthenocarpically.—University of California, Davis.

Grading and marketing.

138. MINISTRY OF AGRICULTURE, LONDON.
Recommended grades for apples produced in
England and Wales for use from 1.9.48 to
31.8.49.

Market. Leafl. Minist. Agric. Lond. 101,
1948, pp. 4.

The requirements under each of three grade schedules,
Extra Fancy, Fancy, and Domestic, are defined.
Diagrams illustrate the amount of blemish permitted.
Until such time as a scheme for the control of the
Standards can be introduced, it is not proposed to
make the grades statutory under the Agricultural
Produce (Grading and Marking) Act, 1928.

139. ERKELENS, M. A.
De kwaliteitskeuring van de N.A.K.B.
(Assessing quality by the Netherlands Inspec-
tion Service.)
Fruiteelt, 1948, 38: 688-90.

An account of the work of the Dutch Inspection
Service in relation to the three quality grades for
nursery trees and graft wood.

140. STAUNING, A.
Aebleeksporten. (Danish apple exports.)
Erhvervsfrugtavl., 1948, 15: 15-17.

The bulk of Danish apple exports go to Finland and
Sweden. The prospects of exports to other countries
are discussed.

141.
a BALDINI, E.
Ricerche sulla sterilità del pesco J. H. Hale
e sul suo comportamento ereditario. (The
male sterility of the J. H. Hale peach and the
inheritance of this character.) [English
summary 10 ll.]
Riv. Ortofrutt. ital., 1948, 32: 141-6, bibl. 2,
illus.

- b KIPER, N. O.
Ankara-Eşkisehir—Çankiri vilâyetlerinde
meyvecilik ve bilhassa armut çeşitlerinin
morfolojik ve biyolojik tetkikatına ait
rapordur. (Fruit growing at Ankara—Eski-
sehir and Çankiri with special emphasis on
the morphology and biology of pear varieties.)
T. C. Yüksek Ziraat Enstitüsü 101, 1937,
pp. 32, illus. [received 1949].

- c MITCHENER, A. V.
Nectar and pollen producing plants in Manitoba.
Sci. Agric., 1948, 28: 475-80, bibl. 1.
- d NAJJAR, H.
Olive harvesting and oil pressing. [Arabic. English summary $\frac{1}{2}$ p.]
Circ. Ext. Ser. Syrian Minist. nat. Econ., Damascus, 11, 1947, pp. 12, illus.
An advisory leaflet.
- e NAJJAR, H.
Planting the fruit orchard.
Pruning young fruit trees.
The pruning of bearing fruit trees.
The grafting and budding of fruit trees.
Rejuvenating and topworking old fruit trees.
[Arabic. Short English summaries.]
Circ. Ext. Ser. Syrian Minist. nat. Econ., Damascus, 13, 16, 17, 19, 20, 1947-48, pp. 16, 14, 24, 20, 20, illus.
A series of advisory leaflets for growers in Syria.
- f REBOUR, H.
Organisation de l'expérimentation fruitière en Algérie. (The organization of experimental work on fruit growing in Algeria.)
Fruits d'outre-mer, 1948, 3: 227-8.
- g SCHWARZENBACH, W.
Aus der Geschichte unseres Obstbaus. (From the history of Swiss fruit growing.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 377-82.
A brief, illustrated survey from pre-historic times to 1800.
- h SEBIRE, L. G.
Plums and cherries in Victoria (Australia).
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 81-2.
- i VIRGINIA, DEPARTMENT OF HORTICULTURE.
Fruit and nut varieties for Virginia.
Bull. Va agric. Ext. Serv. 172, 1948, pp. 25, illus.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(See also 77, 420, 687, 694, 697, 718.)

142. GRUBB, N. H.
Raspberries for the amateur's garden.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 100-8.
Recommendations on cultivation, and on selection of varieties with a note of new hybrid raspberries.

143. DE BIJL, D.
De teelt van bramen in de Bommelerwaard.
(Blackberry culture at Bommelerwaard.)
Fruittteelt, 1948, 38: 604-7, illus.

There are only two small centres of blackberry growing in Holland, at Bommelerwaard (13 ha.) and Kapelle-Biezelinge (8 ha.), with a few other scattered plantations. The culture of the Himalaya berry at Bommelerwaard is here described with reference to soil, planting, spacing, wiring, yields and pests. The raspberry beetle [*Byturus tomentosus*] sometimes attacks the Himalaya berry, but both it and the blossom weevil (*Anthonomus rubi*) can be controlled by DDT, and the blackberry mite [*Eriophyes essigi*] by lime-sulphur.

144. TOMALIN, T. E.
Trained forms for soft fruit.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 92-5.

A description of how to train gooseberries and red currants as single or double cordons, standards and, under exceptional circumstances, fan shapes.

145. STRONG, W. J.
Currants and gooseberries.
Bull. Ontario Dep. Agric. 440, 1948, pp. 19, illus.

The first edition of this bulletin appeared in 1944 (see *H.A.*, 14: 1084); this revised edition includes notes on additional varieties and on the currant fruit fly, *Epochra canadensis*.

146. HOBBS, E. W.
Black currants: six important points of culture.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 96-9.
The points considered are health of planting material, varieties, cultivation, manuring, pruning, and pest and disease control.

147. GRIGGS, W. H., and ROLLINS, H. A.
Effect of soil management on yields, growth, and moisture and ascorbic acid content of the fruit of cultivated blueberries.
Proc. Amer. Soc. hort. Sci., 1948, 51: 304-8, bibl. 16.

A fourth cropping year confirmed earlier results in which mulching blueberries with sawdust gave better growth and yield than clean cultivation or hay mulch. Neither moisture nor ascorbic acid varied as the result of differences in soil management.—Storrs, Conn.

148. SCHWARTZ, C. D., and MYHRE, A. S.
Fertilizer response of blueberry hardwood cuttings.
Proc. Amer. Soc. hort. Sci., 1948, 51: 309-12, bibl. 3.

In these frame trials at Puyallup, Wash., ammonium phosphate gave most satisfactory results as regards shoot growth in blueberry cuttings without any detrimental effects. A soluble compound containing minor and major elements was no better, and tankage was inferior in its results.

149. BANGA, O.
De veredeling van de aardbei in de Verenigde Staten van Amerika. (Strawberry breeding in the U.S.A.) [English summary 6 l.]
Meded. Inst. Vered. Tuinb. Wageningen, 7, 1947, 70 pp., bibl. 56, illus.

Reference is made to the factors which govern the choice of varieties in different regions, viz. day-length,

winter chilling, morphology and physiology of the flowers, resistance to disease, qualities necessary for canning and for quick freezing. Cultivation methods and the results obtained are discussed.

150. JAKOVLIV, G.

Considérations sur la valeur et l'utilisation de nos fruits. Les fraises. (The value and use of our fruits. Strawberries.)

Fruit belge, 1948, 16: 161-4, bibl. 3.

The chemical composition of strawberries is set out to demonstrate their nutritive value, and notes are given on their preservation when fresh, frozen, or as preserves, and on their therapeutic properties.

151. ROGERS, W. S.

Perle de Prague [strawberry] offers earlier fruit.

Grower, 1948, 30: 243.

Fruitgrower, 1948, 106: 190.

In 1948 Perle de Prague produced rather more fruit than Mme. Lefebvre in the first few days of cropping, and continued cropping a fortnight longer. The total marketable crops were: Perle de Prague—3.83 tons/acre, Mme. Lefebvre—2.47 tons/acre. The special stock tested, M.45, is yellow-edge free, but carries mild crinkle. In quality and flavour Perle de Prague is better than Mme. Lefebvre, but the fruit is smaller.—East Malling Research Station.

152. SHAND, P. M.

Perpetual strawberries.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 118-24.

Three quite distinct aspects of strawberry growing in the garden are discussed in these articles. As regards the Perpetuals the author notes their ever-increasing popularity in France, stating that they are being preferred to ordinary strawberries for private and market gardens alike. There has been little written on them in English, other than one American bulletin by Darrow. Much interesting information is given by the present author on French varieties.

153. BLASBERG, C. H.

Growing strawberries in Vermont.

Pamphl. Vt agric. Exp. Stat. 15, 1948, pp. 15, bibl. 5, illus.

The main commercial variety grown in Vermont is Howard 17. Of new varieties tested, Fairland shows promise. Notes are given on planting, cultivation, harvesting, renovating plantations, and controlling pests and diseases.

154. RAPHAEL, T. D.

Strawberry culture—the matted row: preliminary observations.

Tasm. J. Agric., 1948, 19: 118-19, illus.

Records a small trial at the Summerleas Station with certified G.35 Ettersburg Tree strawberries grown under the solid or matted row system. Selected runner stolons were placed in lines to form a solid row or strip from 2 to 3 feet wide. The results indicate that where the stock is healthy, the soil clean and in good heart, and the water supply adequate, a heavy crop of early, high quality fruit may be obtained with this system.

155. SCOTT, D. H., AND INK, D. P.

Germination of strawberry seed as affected by scarification treatment with sulfuric acid.

Proc. Amer. Soc. hort. Sci., 1948, 51: 299-300, bibl. 5.

In trials at Beltsville, Md, scarification of strawberry seed for 15 minutes with concentrated H₂SO₄ lowered germination percentage significantly.

156. JOHANSSON, E.

Gödslings- och bevattningsförsök med jordgubbar. (Manuring and irrigation trials with strawberries.) [English summary 2½ pp.]

Reprinted from *Årsskr. Lantbr, Trädgårdst.*, 1948, pp. 57-82, bibl. 2, as *Meddel. Trädgårdsförs.* 45.

As a result of 6 years' trials at Alnarp with two strawberry varieties the following recommendations are made: On a loam soil with a fairly high content of organic matter and a pH value of about 7, apply 200-300 kg. stable manure per 100 square metres before planting, and 1 kg. sulphate of ammonia, 1 kg. superphosphate and 0.8 kg. sulphate of potash per square metre annually after cropping. In another trial, carried out at Källby, near Lund, stable manure, sewage sludge and artificial fertilizers were compared on a light, sandy loam with a fairly high humus content. There was no significant difference in the effect of these treatments on strawberry yield or quality, all treatments producing a significant increase in yield. Further, at Källby, irrigation was found to have a beneficial effect on the mean yield for the 3-year period of the study. Irrigation tended to delay ripening and sometimes to reduce the firmness of the fruits.

157. FRANKLIN, H. J.

Cranberry growing in Massachusetts.

Bull. Mass. agric. Exp. Stat. 447, 1948, pp. 44, bibl. 6, illus.

An account is given of the preparation, hydraulics, and planting of a cranberry bog. Varieties are briefly described; a large number of new ones are being tested. The bog usually comes into bearing in the fourth year after planting. In winter it is flooded to avoid winter killing of plants exposed to drying winds with their roots in frozen soil. It may be reflooded in April to control pests, diseases and weeds. Occasional partial flooding is practised when frost is expected in the spring and autumn. Irrigation may sometimes be necessary in dry weather. Where growth is moderate, thin dressings of sand are applied in autumn or winter. Cranberries are only pruned when excessive growth reduces yield. Other topics discussed include the control of weeds, pests and diseases, harvesting, storage, grading and marketing.

Vines.

(See also 93.)

158. CROCE, F. M.

La viticultura mendocina. (Viticulture in Mendoza.)

Rev. mens. B.A.P., 1948, 31: 364: 41-9.

The province of Mendoza has 46% of the vine-growing acreage in Argentina, with (in 1945) 14,096 vineyards occupying 106,787 ha. Data are given on various aspects of the industry, e.g. size of vineyards, their

extension in 1945, yields, etc., with information on varieties grown for wine and for the table.

159. SANGERS, W. J.

Het ontstaan van de druiventeelt in Nederland. (The origin of viticulture in Holland.) *Tuinbouw*, 1948, 3: 237-40.

A historical review of viticulture in Holland from the tenth century, with an outline of its development during the nineteenth.

160. COMITÉ POUR LES RECHERCHES SCIENTIFIQUES EN VITICULTURE.

Activité de la station de recherches scientifiques jusqu' à décembre 1947. (The activities of the station of scientific research up to December 1947.)

Rep. Stat. prov. Rech. sci. Vitic. La Hulpe 2, 1948, pp. 28, illus.

Chiefly an account of experiments with growth substances carried out at La Hulpe research station, in the province of Brabant, Belgium, on a number of grapevine varieties using the sodium salts of α -naphthaleneacetic acid, β -naphthaleneacetic acid and 2,4-D, at various concentrations, to study the effect on flowers and fruit. There are also brief notes on the control of red spider with azobenzene and on the effect of hormones on the germination of tomato seeds.

161. KRIMBAS, B.

Ampélographie hellénique. (Viticulture in Greece.)

Progr. agric. vitic., 1948, 130: 69-77, 99-103, 130-6.

The French translation of this article is by P. Mareout. It gives a historical account of viticulture with special reference to vine-growing in Greece and a discussion of Greek varieties in relation to their resistance or susceptibility to injury from drought.

162. ENGEL, F.

Zur Frage der Sortenbereinigung im Weinbau. (Clearing up the variety chaos in viticulture.)

Jb. Hochsch. Bodenk. Wien, 1947, Bd. 1, 1948, 2. (wiss.) Teil, pp. 103-10.

The variety chaos is a serious danger to viticulture at large. European viticulture in general and the Austrian industry in particular should be based on quality production from a greatly reduced number of selected varieties. Direct-producers and, incidentally, table grapes are not suitable for Austrian conditions.

163. PEYER, E.

Eigenschaften der Blauburgunderrebe. (Characteristics of the vine variety Blauburgunder. Preliminary communication on clonal selection.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 393-7.

The vine variety Blauburgunder (Pinot noir) has proved of great importance in eastern Switzerland, where clones selected by the Wädenswil research station were planted on a big scale. The need for further selection is emphasized by the data submitted for grapes harvested from 5 Blauburgunder plants in the same vineyard. Differences in yield and quality remained consistent throughout the 8-year period

during which records were taken. Selection work at Wädenswil continues.

164. DESFLASSIEUX, A.

Raisins de table. (Table grapes.)

Progr. agric. vitic., 1948, 130: 159-65.

Advice is given on cultural operations and choice of varieties. Fourteen varieties are mentioned with descriptive notes.

165. LEYVRAZ, H.

L'encépagement du vignoble romand et la culture des variétés à raisins rouges de cuve. (The cultivation of red grapes for wine making in French-speaking Switzerland.)

Rev. romande Agric., Vitic., 1948, 4: 59-62, 67-9, bibl. 11.

Trials at Lausanne, extending over decades, have shown that direct-producer vines will yield good red table wines, provided the right varieties are chosen. There are three in the category of first-class varieties: Pinot noir, Gamay du Beaujolais and Merlot, five recommended as good and five for the production of ordinary wines. Characteristics and cultural practices are discussed in respect of all the varieties mentioned.

166. MANUEL, H. L.

The planting of grape vines. Suitable soils and good management are essential to success.

Agric. Gaz. N.S.W., 1948, 59: 380, 390.

A short article emphasizing the need for deep working the soil before planting. The soil should be such that it can be deep-ploughed to a depth of from 14 to 18 in., and this may be supplemented, if desired, by subsoiling.

167. CROCE, F. M.

El cultivo de las uvas corinto para pasas.

(The cultivation of currant grapes.)

Rev. mens. B.A.P., 1948, 31: 365: 50-1.

Data are presented for grapes grown in Argentina for drying as currants and raisins. The regions where they are grown and the acreages are quoted; the province of Mendoza comes first with 27.2 ha. out of a total of 40.8 ha. under vines. Export figures are tabulated.

168. BONNET, A.

Un cépage méritant mal connu: l'Aubun.

(A little-known but valuable wine grape variety: Aubun.)

Progr. agric. vitic., 1948, 130: 203-8.

The grapevine variety Aubun is described as one worthy of more intensive cultivation. It is a black grape and so cannot be confused with the white variety, Aubin. The good qualities of Aubun are mentioned and an analysis is given of wine prepared from it. It is relatively resistant to a number of diseases.

169. MALAN, A. H.

Uneconomic vines and gaps in the vineyard.

Fmg S. Afr., 1948, 23: 697-702, illus.

A plea for the elimination of uneconomic vines and the filling of gaps in S. African vineyards; with practical advice on the selection of parent vines for propagating, re-grafting, and layering in established vineyards, and the transplanting of fully-developed vines.—W. Prov. Fruit Res. Stat., Stellenbosch.

170. BERRY-SMITH, F.

Trellising and pruning grape vines.*N.Z. J. Agric.*, 1948, 77: 59-62.

Three systems of trellising grapevines, viz. low trellis, the arched pergola, and the complete overhead pergola, are described and illustrated with diagrams and photographs.

171. QUINN, D. G.

Vine trellising and pruning in irrigated areas.*J. Dep. Agric. Vict.*, 1948, 46: 293-300, bibl. 1, illus.

This article describes developments in pruning made necessary to counter the increased growth and crop potentiality of vines grown in arid regions where they are dependent on irrigation, and to meet the inherent peculiarities of the varieties popular in these areas. Methods of pruning and training are described and illustrated for the varieties Sultana, Ohanez, Zante Currant, Waltham Cross and Muscat Gordo Blanco. Notes are given on the fruit-bearing wood of the vine, number of rods per vine, renovation of crowns, and wrapping down rods. Summer pruning is not generally recommended, but disbudding is advised for the currant, particularly Gordo. Bunch thinning three weeks before or three weeks after flowering is important for table fruit. Pruning should always be done after frosts. In rod-pruned varieties, such as Sultana and Shiraz, pruning causes the sprouting of dormant main buds on the rods which will carry some fruit, but its chief purpose is to induce the development of strong pruning canes for the following year.

172. MANARESI, A., AND OTHERS.

Osservazioni sullo sviluppo delle viti su vari tutorivivi adoperati nell'Emilia e nell'Veneto. (The development of vines on different living supports in the Provinces of Emilia and Venice.) [English summary 16 ll.]

Riv. Fruttic., 1948, 10: 121-48, bibl. 8.

The authors' observations lead them to conclude that the vine grows most strongly when trained on inanimate supports. Then in descending order of vine growth come the maple, pear (pruned hard), elm, black poplar, and ash (*Fraxinus ornus*). Other trees used as living supports which, as compared with the above, give rise to inferior growth, are (in any order) ash (*Fraxinus excelsior*), apple and cherry. *Ulmus pumila* is unsuitable as a support.

173. DALMASSO, G.

Le controle de la maturité des raisins de table. (Determining the ripeness of table grapes.)

Progr. agric. vitic., 1948, 130: 223-8, bibl. 13.

The degree of ripeness of table grapes is determined by (1) the density of the grapes or of the must, (2) the mustimetric degree and (3) the acidimetric degree of the must. The last is described in some detail.

174. WINKLER, A. J.

Heat summation tests for table grapes—the relation of heat summation to time of maturing and palatability.

Proc. Amer. Soc. hort. Sci., 1948, 51: 295-8, bibl. 4.

Heat summation data from Davis, Calif., for Thompson Seedless, Malaga, Red Malaga, Emperor and Tokay varieties taken in relation to degrees Balling prove useful for determining the best time for picking.

Nuts.

(See also 141i.)

175. HENRY, A. M.

Report on nuts and nut products.*J. Ass. off. agric. Chem. Wash.*, 1948, 31: 521-5.

Almond, coconut and pecan are among the nuts mentioned. Methods of analysing them are suggested.

176. WILLIAMS, H. A.

Edible varieties of almonds [in England].*The Fruit Year Book 1948*, Royal Horticultural Society, London, 1948, pp. 125-8.

The results of analysis of nuts from decorative almond trees growing near London in 1942 show that these are almost entirely the common almond, *Prunus amygdalus* or closely related forms, affording an attractive food. As regards other almonds the author notes the dangerous amount of HCN in the nuts of *P. amygdalus amara*, *P. amygdalus pollardii*, *P. tenella* (*P. nana*) and *P. amygdalo-persica* in contrast to those of *P. amygdalus Batsch* (*P. communis* (L) Arcang.) and its variety *praecox*, with only about one-twentieth as much HCN. Nuts from *P. amygdalus macrocarpa* and *P. amygdalus dulcis* produce practically no HCN.

177. AMIZET, L., AND AMIZET, A.

Contribution à l'étude de l'amandier en Afrique du Nord: de la pollinisation. (Contribution to the study of the almond in North Africa: pollination.)

Fruits et Prim., 1948, 18: 195-7.

A short survey ends with an exhortation to growers to plant, in sufficient numbers, inter-fertile varieties which flower at the same time, and to keep bees. A table shows the flowering season of 9 varieties.

178. MAURI, N.

La culture du pacanier. (Pecan culture in Algeria.)

Bull. Serv. agric. gen. Algér. 142, 1948 (?), pp. 43, bibl. 13, illus.

A study, based on North African and U.S.A. experience, treating the subject under: description and origin; pecan production in U.S.A., Algeria and other countries; varieties; multiplication; establishing and tending orchards; cropping; cultivation programme.

179. HAMMAR, H. E., AND HUNTER, J. H.

Influence of fertilizer treatment on the chemical composition of Moore pecan leaves during nut development.

Plant Physiol., 1949, 24: 16-30, bibl. 22.

A study, made at the U.S. Pecan Field Station, Albany, Georgia, of the changes occurring in the chemical content of pecan leaves during the summer months. Analyses were made from 4 differently fertilized plots to determine whether the need for specific elements at definite times could be met by careful fertilizer treatments. The results are represented graphically, and show, in general, that nitrogen, phosphorus and

potassium decrease rapidly during the season, while calcium accumulates. These seasonal changes occurred in all cases, but the rate of change and the mineral ratio were considerably affected by fertilizer treatment. The causes of leaf scorch were discussed in this connexion.

Noted.

180.

- a BAZIRE, P.
Quelques considérations sur la viticulture en Haute-Savoie. (Viticulture in the French Department of Haute-Savoie.)
Rev. Vitic., 1947, 93: 294-9.
A history of the Ripaille vineyards on the Lake of Geneva.
- b BLAHA, J.
Katastr viničních tratí na Moravě a v Čechách. (Centres of viticulture in Czechoslovakia.)
Knihovna Ústředního svazu čsl. vinařů. Svazek Č. 20, Brno, 1948, pp. 94.
- c BUSH, R.
Strawberry growing for the amateur.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 114-17.
- d GLENN, E. M., AND HAMOND, J. B.
Storing walnuts [for home use].
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 129-31.

- e HAVERGAL, B.
Strawberry forcing, including the use of Dutch lights and cloches.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 109-13.
- f P[OTTER], J. M. S.
Gathering and storing cob nuts and filberts.
The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, p. 131.
- g RIETSEMA, I.
Geschiedenis der zwarte bessen. (The history of the black currant.)
Meded. Direct. Tuinb., 1948, 11: 774-80.
- h SLATE, G. L.
Breeding autumn-fruiting raspberries: third report.
Proc. Amer. Soc. hort. Sci., 1948, 51: 301-3, bibl. 2.—Geneva, N.Y.
- i VAARAMA, A.
Morphological and cytological studies on colchicine-induced tetraploid *Ribes nigrum*.
Suomen. Maataloust. Seur. Julk., 1947, 67: 55-93, bibl. 56.
- j VAARAMA, A.
Cytogenetic studies on two *Rubus arcticus*-hybrids.
Maataloust. Aikakausk., 1948, 20: 67-79, bibl. 19.—Piikkiö, Finland.
- k VAARAMA, A.
Cryptic polyploidy and variation of chromosome number in *Ribes nigrum*.
Nature, 1948, 162: 782, bibl. 6.—Piikkiö, Finland.

PLANT PROTECTION OF DECIDUOUS FRUITS.*

General.

- 181. VAN HELL, W. F.
Phytopathology in Switzerland.
Chron. Nat., 1948, 104: 105-11, bibl. 20.
A report of a visit by the author, phytopathologist at the A.V.R.O.S. Experimental Station, Sumatra, to Switzerland, in 1947. He deals with the work of the chemical industries, the experimental stations, and the university laboratories.
- 182. THOMPSON, W. R.
Reports on the parasitic service 1945-46 and 1946-47.
[Publ.] *Commonw. agric. Bur.*, H.M. Stationery Office, Lond., 1948, pp. 11, 1s.
Summaries of the activities of the organization now known as the Commonwealth Bureau of Biological Control, Belleville, Ontario.
- 183. WENZL, H.
Das neue österreichische Pflanzenschutzgesetz. (The new Austrian plant protection law.) *PflSchutz Ber.*, 1948, 2: 145-56.
A short introduction is followed by a verbatim report of the regulations which became law in June 1948.

- 184. BROWN, W., BROOKS, F. T., AND BAWDEN, F. C.
A discussion on the physiology of resistance to disease in plants.
Proc. roy. Soc. Lond., Ser. B, 1948, 135: 879: 171-95, bibl. 34.
The three papers contributed to this discussion were:
BROWN, W. The physiology of the facultative type of parasite. pp. 171-9.
BROOKS, F. T. Host resistance to fungi, chiefly in relation to obligate parasites. pp. 180-6; and
BAWDEN, F. C. Some effects of host-plant physiology on resistance to viruses. pp. 187-95.
Brown gives a classification of plant diseases on the basis of the causal agent, pointing out certain broad differences between diseases of plants and of animals. He describes the physiology of (1) the pre-penetration phase, (2) the process of penetration, and (3) the post-penetration phase.
Brooks discusses host resistance chiefly in relation to the rusts of cereals, but also to certain facultative parasites of fruit trees, such as *Stereum purpureum*, *Armillaria mellea* and *Nectria galligena*.
Bawden describes types of resistance shown by susceptible hosts towards viruses, as in the recovery of plants

* For weeds and herbicides see 320-354.

from an initially acute disease, and the protection against a serious pathogen conferred by earlier infection with a related but innocuous one. He gives examples to show that the physiological condition of plants greatly influences their resistance to viruses.

185. DIRECTIE VAN DE LANDBOUW.

Bescherming van nuttige vogels. (Protecting useful birds.)

Meded. PLZiektDienst Wageningen, 17, 1948, pp. 32, illus.

Measures for protecting useful birds are discussed under:—nesting boxes (described and illustrated), bird corpses, winter feeding, drinking troughs, and nesting accommodation for storks. Keys and drawings for the recognition of the birds are given.

186. CHOWDHURY, S.

Plant diseases, their causes and control.

Kitabistan, Allahabad and Karachi, 1948, pp. 106, bibl. 27, illus., Rs. 4/8.

This booklet describes, in simple style, the causes of plant diseases and methods of control. The subject is treated in general terms and specific diseases are not dealt with. It can be recommended as an introduction to more detailed study.

Nutritional disturbances.

(See also 10, 43-52, 384, 409, 433, 692, 701.)

187. WALSH, J. C.

Soil fertility in the orchard.

J. Dep. Agric. Vict., 1948, 46: 345-9, illus.

An account of deficiency symptoms in fruit trees, with recommendations for remedying deficiencies of nitrogen, phosphorus, potash, zinc, magnesium and boron, with a note on green manuring.

188. BLODGETT, E. C.

Chlorosis in plants in Idaho.

Circ. Idaho agric. Exp. Stat. 110, 1946, 7 pp. [received 1948].

The causes underlying chlorosis (particularly lime-induced) and its control are discussed. The most common treatments have been the application of ferrous sulphate, sulphur or combinations of such materials to the soil to change the soil reaction from alkaline to acid as a means of providing available iron. Beneficial results have been obtained by spraying the plants with ferrous sulphate solution and by injections of ferrous ammonium citrate crystals. Deciduous trees, if sprayed, should receive solutions of ferrous sulphate not stronger than the following percentages: peaches and pears 0.5 to 1; prunes 0.5; apples 1; grapes 2; brambles 2; strawberries 2; ornamentals 1.

189. DAVISON, J. R.

Lime-induced chlorosis of fruit trees on the Murrumbidgee Irrigation Area.

Agric. Gaz. N.S.W., 1948, 59: 410-13, bibl. 5.

Fruit trees growing in certain soils of the Murrumbidgee Irrigation Area, which have a highly calcareous subsoil, show iron deficiency, which can be corrected by the use of iron salts in certain ways, e.g. crowbar hole plugs and solid injection into the soil. In that area the control is most efficient when a long, comparatively thin column of iron sulphate spans the depth of the root zone.

190. KASTENDIECK, M.

"Rosettenkrankheit"—eine ernste Bedrohung des Obstbaues? (*Little leaf of apple.*)

Ceres, Hamburg, 1948, 1: 9: 18-19.

A disease of apple trees was spreading at an alarming rate in the spindlebush plantation of the research station Limburgerhof, Germany, until it was recognized as little leaf. Symptoms are described and illustrated. Spraying experiments with zinc sulphate are in progress.

191. WALSH, J. C.

Zinc deficiency in deciduous trees.

J. Dep. Agric. Vict., 1948, 46: 320.

A brief note describing the symptoms of zinc deficiency ("little leaf") in deciduous trees in parts of the Goulburn Valley and Horsham district of Victoria. The leaves of affected trees are small, narrow and chlorotic, and fall progressively from the base to the tips of twigs, which later may die from the tips downwards. In stone fruits interveinal chlorosis or yellowing of affected leaves is most noticeable. Zinc sulphate (50 lb. per 100 gal. water) sprays in the winter are the best remedy.

192. BARBIER, G.

Guérison, au moins partielle, d'une maladie des pommiers du Palatinat par application de zinc. (A partial cure of a disease of apple trees in the Palatinat by applying zinc.)

C.R. Acad. Agric. Fr., 1948, 34: 786-7.

A disease of apple trees in the French zone of occupation in Germany, the symptoms being small, narrow, yellow, wavy leaves, was reduced in intensity by spraying the trees in February with a solution of zinc sulphate.

193. ASKEW, H. O., AND KIDSON, E. B.

The control of magnesium deficiency of apple trees in the Nelson district, New Zealand.

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 247-55, bibl. 1, illus.

Magnesium deficiency has been controlled on Sturmer, Jonathan, and Cox's Orange Pippin apple trees in certain areas in New Zealand by the use of ground dolomite and magnesium carbonate. The state of the trees was correlated with the magnesium content of the leaves.—Cawthron Institute, Nelson, New Zealand.

194. LEONE, I. A., AND OTHERS.

Some effects of fluorine on peach, tomato and buckwheat when absorbed through the roots.

Soil Sci., 1948, 66: 259-66, bibl. 6, illus.

Concentrations of 200 and 400 p.p.m. of fluorine in the nutrient solution caused the death of peach, tomato, and buckwheat plants in a short time. With lower concentrations the effect was less drastic. At 10 p.p.m. peach leaves showed injury but there was no injury to tomato or buckwheat foliage, and below 10 p.p.m. there was no injury on any of the plants.

195. TRAAS, C., Jr.

Jonathan spot.

Fruiteelt, 1948, 38: 532-3, illus.

The symptoms (on the tree and in storage), cause, and control of Jonathan spot in apples are discussed. The fruits most susceptible to this disorder are those that are deeply coloured, large, and picked late, and the

intensity of the spotting is affected by the temperature in the store and the degree of spotting on the fruit at the time of storing. The cause of Jonathan spot and its control are unknown but certain precautions are recommended, i.e. selecting the fruit with the least colour, small, and picked early, and storing it directly after picking. The value of Jonathan as a dessert apple depends on its colour and size, and the grower has to decide between producing brightly coloured, large fruit which must be sold quickly and the less coloured, smaller ones for storage.

196. VAN KATWIJK, W.
Steenachtigheid bij peren. (Stoniness in pears.)

Fruitteelt, 1948, 38: 503-4, illus.

The causes of stoniness in pears is discussed under (a) nutritional disturbances, (b) virus disease (reference to work in other countries) and (c) injury caused by the capsid bug *Calocoris fulvumaculatus*. The capsid can be controlled by spraying, in winter, with 6% mineral oil, and in summer with preparations containing DDT or rotenone.

197. NAJJAR, H.
Gummosis of fruit trees. [Arabic. English summary 1 p.]
Circ. Ext. Serv. Syrian Minist. nat. Econ., Damascus, 27, 1948, pp. 16.

The causes of gummosis in fruit trees are discussed. In Syria the disorder mostly shows as localized cankers or as general outbursts of gum from all the branches. Precautions to be taken are outlined.

198. LOUW, A. J.
Investigations on the cracking of Ohenimuri apples.
Fmg S. Afr., 1948, 23: 596-602, bibl. 11, illus.

The theories of former observers on the cause of apple cracking are discussed. From his spraying experiments in which he failed to control the trouble by fungicides the author concludes that it is a functional disease. Improving the vigour of the trees by pruning and other cultural measures reduces the cracking, but there are many environmental factors which also play their parts in the disorder.

Climatic factors.

(See also 2, 13, 63.)

199. VAN KATWIJK, W.
Enige afwijkende verschijnselen bij pruimen.
(Some disorders of plums.)
Fruitteelt, 1948, 38: 566-7, illus.

In 1948 certain disorders of plums due to sudden changes in temperature and air moisture were more prevalent in Holland than in previous years, viz. (1) brown spots on the unripe fruit of Early Laxton, first noticed during the first warm period of the second week of June, (2) sun scald at the end of July, (3) irregular misshapen fruit during the first warm period after heavy rain, (4) fruit cracking during a wet period following a drought, (5) fruit gumming, due to unfavourable weather particularly during flowering, seen mostly on the varieties Reine Claude d'Altham, Dubbele Boerenwitte, and Victoria. Another disorder, not

directly caused by weather conditions but influenced by them, is known as "Het blond" in the IJssel district. It starts as small, dark green spots which increase in size and become violet. It is suggested that this may be a virus disease.

200. COOLEY, J. S.
Collar injury of apple trees associated with waterlogged soil.

Phytopathology, 1948, 38: 736-9, bibl. 5.

Five-year-old apple trees growing in a heavy soil and having had wet conditions during the summer developed a collar injury which was apparently the result of the waterlogged soil.

201. BRIERLEY, W. G.
What is a "test winter" ?
Minn. Hort., 1948, 76: 116-17.

Although by no means severe, the winter of 1947/48 became a so-called "test winter" for fruit growers in Minnesota, where frost damage was general and serious. Factors contributing to increased susceptibility were a short summer in 1947, a heavy crop and a drought from August to October, which delayed maturity. On 7 November the weather changed suddenly to snow and frost without giving the trees and canes time to become gradually hardened. In a discussion of frost resistance the instability of this property is emphasized. It is the speed with which cold resistance is acquired at the beginning of winter and, possibly more important, regained after a mild spell, that may determine survival in a woody plant. Varieties classed as hardy may be presumed to be so, not because they are capable of enduring particularly low temperatures, but because they have a greater capacity to retain resistance longer during a mild spell or regain it more quickly afterwards.

202. CAMERON, L. G.
Frost in south-west England.
[*Mim. Publ.*] *met. Off. Air Minist. Lond.*, 1948, pp. 39+17 figs.

A study of low temperature data for the south-west of England undertaken as a contribution to the necessary background for the study of frost damage and its prevention. It is aimed at presenting the available data in such a form as can be used not only by agriculturists but also by future research workers who may carry the study of frosts to its logical conclusion. No attempt has been made to correlate temperature data with wind, humidity, exposure, or aspect.

203. HARROW, R. L.
The effect of frost of the winter of 1946-47 on vegetation. Frost damage survey, Pts. I and II.
J. roy. hort. Soc., 1948, 73: 389-415, 439-48.

Some meteorological notes on the severe winter of 1946-47 in Britain are followed by a long alphabetical list of cultivated plants showing the frost damage, if any, suffered by each. A list is given of gardens from which this information was received showing their locality, elevation, situation, and minimum recorded temperatures. The lowest temperature recorded is -8° F., on grass.

204. GAYFORD, G. W.

In the orchard.

J. Dep. Agric. Vict., 1948, 46: 318-19.

Notes on frost damage to fruit and vines, factors affecting the degree of frost and frost control (orchard heating and wind machines).

205. LAINE, T.

Hallantorjunta kokeiden valossa. (Frost prevention trials.) [English summary 1 p.]

Kirjapaino-Osakayhtiö Kalevan kirjapaino, 1948, pp. 43, illus.

Trials were carried out in northern Finland with a small and simple fog-generating apparatus constructed by the author, which is described and illustrated. It is based on the principle of heating wet sphagnum moss or wet straw with crystallized sulphuric anhydride (SO_3). The resulting white, thick, heavy fog, of a particle size of the order of 1/1000 mm., was found to be non-injurious to plants. On calm nights it persisted for 4-6 hours. The fog produced by one generator was shown to protect an area of about $\frac{1}{2}$ acre. From the data presented in the English summary the following may be quoted: During the nights 30/31 May and 2/3 September, 1947, the temperatures outside and within the fog were recorded as -4.0°C ., $+0.2^\circ\text{C}$., and as -7.5°C ., -0.5°C respectively. It was further found that floating dust must be excluded as a possible means of frost protection, since the particles have a cooling effect on the air layers near the ground.

206. FILEWICZ, W., AND MODLIBOWSKA, I.

Produkcja cennych owoców delikatnych odmian w surowym klimacie. (The growing of frost-susceptible dessert apple varieties in a severe climate.)

Przegląd ogrodniczy, 1947, 24: 294-6.

It has been shown at the Sinoleka Experiment Station that tender, dessert apple varieties such as Cox's Orange can be grown successfully in Poland provided they are top-worked on a hardy variety such as Antonovka, the stem and the crotch being of the hardy variety. The top-working is carried out gradually in 2-3 successive years, the south-western branches remaining unworked. This Sinoleka method proved effective in the severe winter of 1939/40. Since it was found that the frost resistance of the whole tree is positively correlated with the amount of Antonovka elements left, including leaves, the frameworking method is expected to prove the most suitable for severe climatic conditions. If this method (stub- or side-grafting) is used, not only the stem and crotch but also the scaffold branches are of the hardy variety. Frameworking was first used in 1938 at Sinoleka, being introduced from East Malling. W.F.

207. MAURER, J. K.

Durch Gerüstbildner ein krisenfester Tafelobstbau. (Frame builders to increase the frost resistance of dessert apples.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 383-4, 399-403.

Cox's Orange and other dessert apples can be grown in very cold districts, such as the Vistula area, where in a normal winter the temperature drops below -40°C ., provided frost-resistant stem or frame builders are used. The variety should be topworked about 30 cm.

above the crotch, the furnishing shoots of the limbs being left as far as possible. Twelve frame builder varieties, which have proved their worth, are named and discussed. A study of several other varieties is recommended.

208. RUI, D.

Indagini sulla resistenza delle talee di vite alle basse temperature. (Resistance of vine cuttings to low temperatures.) [English summary 13 ll.]

Ann. Sper. agrar., 1948, 2 [n.s.]: 457-67, bibl. 4.

At Conegliano cuttings of European vines, white—Riesling Italico, and red—Cabernet Franc, and of an American vine very commonly used as rootstock, namely Berlandieri \times Riparia 420A, were submitted to temperatures of $\pm 0^\circ\text{C}$., -5°C ., -10°C ., -15°C ., and -20°C for periods of $\frac{1}{2}$ hour, 1, 3, 6, 9, 12 and 24 hours, after being collected from the vines at three different dates, viz. 30 November, 30 January and 21 March and laid in sand for 18 days, 2 days and 21 days respectively. After treatment they were planted out in a normal way and observed. Some 15,000 cuttings were involved in all. Observations are plotted. The European varieties were found to be less resistant than the American, being damaged by early and winter frosts of -15°C and by late frost at -5°C . The critical temperatures for the American vine were -20°C for early frost, -10°C for late frost, but in winter even temperatures of -20°C had no effect on the cuttings.

209. H., E. R.

Frost protection.

Agric. Engng Rec., 1948, 2: 176-7.

A short account of the frost problem as it affects fruit growers in Britain is followed by a brief description of the usual methods for combating frosts and some suggestions for achieving better protection. A likely solution would be to make use of low-grade radiated heat. Radiation heating, as a means of protecting crops against frost, was dismissed as useless 20 years ago, but recent research may show that it is better and more economical than direct heating, because it is the temperature of the crop rather than that of the surrounding air which is affected. An apparatus is described which consists of an atomizer oil-burner with a heater tube that operates at dull red heat. One experimental machine in Britain has a heater tube 18 ft. tall and has afforded protection over an area of one acre. Experiments made in America with both electrically and oil-heated machines have resulted in a rise in the crop temperature of 8°F . Another source of low-grade heat is the warm air at higher levels, which can be made available. Such a method has been tried in America and Australia, where large propellers rotating horizontally have been used to draw down the warm ceiling air. American machines have been driven by relatively powerful engines, 90 b.h.p. car engines being common, and two aeroplane propellers mounted on a tower have proved satisfactory for the protection of 22 acres. The Australian trials have been made with a propeller of 30 ft. diameter powered by a 10 h.p. engine, and, although the experiments have not given the same degree of protection as attained in

America, the results were particularly promising in view of the smaller engine used. A similar propeller to that tried in Australia with a diameter of 20 ft., a normal running speed of 120 r.p.m., and powered by a 10 h.p. engine, has been constructed by the N.I.A.E. and, although conditions in Britain are different from those in Australia, it is hoped that it will be possible to afford protection to 3 acres.

210. DEARBORN, C. H.

Preliminary notes on frost prevention under cold frame glass by sprinkling the glass with cold water.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 493-6.

Preliminary trials at Geneva, N.Y., with makeshift apparatus indicate that a well-distributed flow of 5 gallons of water per hour down the outside of a sash will give more protection to plants under glass than a double layer of bamboo mats. It appears essential that the sash should have at least a 4-inch slope in 6 feet and be very securely glazed.

211. CUTHBERTSON, E. G.

The athel tree (*Tamarix (aphylla) articulata*).

Valuable for shelter belts in western districts.
Agric. Gaz. N.S.W., 1948, **59**: 395-8, 402, bibl. 5, illus.

An account is given of the athel tree and of the favourable results obtained with it as a windbreak in some areas of New South Wales. Methods of propagating it from cuttings, and the use in the nursery of galvanized iron sleeves to hold soil in which to strike cuttings, are described.

212. RAO, K. S., RAO, M. B., AND RAO, B. S.

Drought resistance of plants in relation to hysteresis in sorption.

Curr. Sci., 1948, **17**: 334, bibl. 5.

A note on a study which indicates a correlation between the drought-resisting property of the plant and the capillary structure of its leaf.

Viruses and unknown agents.

(See also 196.)

213. KÖHLER, E., AND HAUSCHILD, I.

Betrachtungen und Versuche zum Problem der "erworbenen Immunität" gegen Virusinfektionen bei Pflanzen. (Reflections and experiments on "acquired immunity" to virus infection in plants.)

Züchter, 1947, **17/18**: 97-105, bibl. 18 [received 1949].

The experiments tend to show that the immunity to related viruses, which may be conferred by a virus, results from the exhaustion of building material in the plant cell by the first virus infection. Competition between the two viruses precludes multiplication of the second and its penetration into the phloem. In the case of infections with two unrelated viruses, the specific requirements of each will not lead to competition and both types may thrive in the plant. The investigations were carried out with tobacco virus at the Celle branch of the Biologische Zentralanstalt for north-western Germany.

214. WENZL, H.

Die Krankheitsabwehr der Pflanze. (Disease resistance in plants.)

Jb. Hochsch. Bodenk. Wien, 1947, Bd. **1**, 1948, 2. (wiss.) Teil, pp. 111-22, bibl. 14.

Includes a discussion on the practicability of inoculating plants to increase their resistance to virus infection.

215. SUHOV, K. S.

The virus of plant tumours. [Russian.]

Priroda (Nature), 1948, No. 8, pp. 60-2, bibl. 4, illus.

A review of work on plant tumours caused by infection by viruses, based mostly on studies in America by Black. (See *H.A.*, 16: 219, 1886.)

216. MULDER, D.

Aucubabont van appelbomen. (Aucuba mosaic of apple trees.)

Fruitteelt, 1948, **38**: 676, illus.

An aucuba-like yellow mottling of apple leaves seen in Holland in the spring of 1948 is considered to be a virus disease, and control measures suggested are: (1) trees seriously affected should be grubbed, (2) affected branches should be cut off, (3) no graft wood should be taken from affected trees.

217. BERKELEY, G. H., AND WILLISON, R. S.

Yellows and necrotic ring spot of sour cherries in Ontario: inoculation experiments.

Phytopathology, 1948, **38**: 509-18, bibl. 9, illus.

The symptoms of sour cherry yellows and necrotic ring spot are described and illustrated. Necrotic ring spot has a short, acute phase on sour cherry, peach, Italian prune, and Lombard plum, and a chronic phase, with absence of symptoms, on peach and plum, and frequently on sour cherry, with mild symptoms occasionally. The chronic phase of yellows on sour cherry is characterized by yellowing and casting of leaves in early summer; on peach and plum the symptoms are similar to those of dwarf prune.

218. WILLISON, R. S., BERKELEY, G. H., AND CHAMBERLAIN, G. C.

Yellows and necrotic ring spot of sour cherries in Ontario—distribution and spread.

Phytopathology, 1948, **38**: 776-92, bibl. 10.

The data recorded indicate "that a greater percentage of trees are likely to be infected with necrotic ring spot than with yellows when an orchard is set out, that rates of spread are largely determined by initial incidence and by the relative position of affected and "healthy" trees at planting, and that little fundamental difference in the rates and manner of spread of the two diseases can be expected even when apparent differences are considerable".—Dominion Laboratory of Plant Pathology, St. Catharine, Ontario.

219. NICHOLS, C. W.

The little cherry situation in Idaho.

Plant Dis. Repr., 1948, **32**: 433-4.

There is evidence that there are two strains of little cherry virus in Idaho. New symptoms, particularly short pedicels, have been noted on cherries in southern parts of the State.—Univ. of Idaho.

220. HORN, N. L.
Transmissibility of the mild streak virus of black raspberry.
 Abstr. in *Phytopathology*, 1948, **38**: 576.
 Mild streak virus of black raspberry was transmitted to healthy black raspberry plants by grafting and by the use of dodder.
221. DEMAREE, J. B.
Brown berry disease of black raspberries.
Plant Dis. Repr., 1948, **32**: 251-2, bibl. 5.
 The symptoms of brown berry disease have been confused with those of the mild streak virus disease, but they can be distinguished fairly accurately. Brown berry kills one to several fruits in a cluster during the green stage, whereas the most distinctive symptoms of mild streak do not show until the berries are ripening.
222. HORN, N. L.
A new virus disease of blackberry.
 Abstr. in *Phytopathology*, 1948, **38**: 576, and *Phytopathology*, **38**: 827-30, illus.
 A new virus disease of blackberry, *Rubus allegheniensis*, seen in Maryland is graft transmissible to blackberry and black raspberry. The symptoms are a striking leaf variegation.
223. ESAU, K.
Anatomic effects of the viruses of Pierce's disease and phony peach.
Hilgardia, 1948, **18**: 423-82, bibl. 49, illus.
 Pierce's disease of the grapevine and dwarf disease of alfalfa are caused by the same virus. The internal symptoms of phony disease observed in peach roots resemble those induced by Pierce's disease virus.
224. DEMAREE, J. B.
Yellows or xanthosis in strawberries in eastern United States.
Plant Dis. Repr., 1948, **32**: 428-32, bibl. 5.
 Serious outbreaks of a strawberry disease in certain eastern United States are diagnosed as xanthosis (yellow edge). Indexing of varieties and propagation from disease-free stock are recommended. Plants proved to be free of virus must be propagated under surveillance in a vector-free area for replacement of planting stock now being used. Reference is made to the testing and certification measures in Great Britain.
225. LOOMIS, N. H.
Variation ("Blakemore Yellows") in Klommore strawberries.
Plant Dis. Repr., 1948, **32**: 442.
 A brief note reporting that in a half-acre field of Klommore (a cross of Klondike and Blakemore) strawberries in S. Louisiana in 1948, 75% or more of the plants showed variegation resembling Blakemore yellows.
226. BRANAS, J.
 Recherches sur la dégénérescence infectieuse de la vigne. (*Infectious degeneration of the vine.*)
Progr. agric. vitic., 1948, **130**: 180-8, illus.
 As a result of grafting experiments the author concludes that infectious degeneration of the vine is caused by two viruses: in one case mosaic was separated from the foliar deformation of the variety Rupestris du Lot.
227. FLIPSE, L. P.
 Aftstervingsverschijnselen bij steenvruchten. (*Dieback of stone fruit trees.*)
Fruiteelt, 1948, **38**: 500-2.
 The symptoms of dieback in stone fruits (plum, cherry, and glasshouse peach) in Holland are described. The disease is particularly severe on the Victoria and Ontario plum varieties. The cause is being investigated and reference is made to the organisms found associated with dieback in other countries. It is considered that the severity of the disease depends on cultural conditions.
- Bacteria.*
228. DE ROPP, R. S.
The interaction of normal and crown-gall tumor tissue in *in vitro* grafts.
Amer. J. Bot., 1948, **35**: 372-7, bibl. 5, illus.
 Tumours have been known to arise from normal tissue of *Helianthus annuus* to which bacteria-free crown-gall tissue had been grafted. This suggested the existence of a virus-like factor capable of being transmitted from tumour to healthy tissue by grafting. The experiments described in this paper were designed to throw further light on the development of these induced tumours. Various strains of tumour tissue were grafted *in vitro* on to healthy sunflower stock, and after 6 weeks the grafts were examined microscopically. All induced tumours arose at the point of union, so no evidence was obtained of their arising directly from healthy tissue. Wounding and auxin treatment also failed to induce tumours on a normal stem grafted with tumour tissue. On anatomical evidence the theory is put forward that "induced tumors may be composite structures into the make-up of which both normal and tumor tissue enter, the xylem and chlorophyll-bearing layer arising from normal stock, the cortex from the tumor scion". [See also *H.A.*, 17: 1309, 1887.]
229. BRAUN, A. C.
Studies on the origin and development of plant teratomas incited by the crown-gall bacterium.
Amer. J. Bot., 1948, **35**: 511-19, bibl. 19, illus.
 When the T37 walnut strain of the crown gall bacterium was inoculated into Kalanchoe stems, typical undifferentiated tumours were produced. Experiments were designed to "determine whether the morphologically complex structures that developed from the tumors were the result of the growth of normal host cells that had been stimulated by the expanding tumor", or whether the tumour cells themselves were capable of differentiation. The results suggested that these structures were the growth of tumour cells that had recovered in varying degrees from the tumour-inducing principle.
230. DEMAREE, J. B., AND SMITH, N. R.
A gall disease of blueberry caused by a bacterium.
 Abstr. in *Phytopathology*, 1948, **38**: 575.
 Galls, probably caused by a strain of *Agrobacterium tumefaciens* [= *Bacterium tumefaciens*], have been found (sometimes serious in nurseries) on blueberries in Michigan, New Jersey, New York, and Oregon.

231. FLEURY, C., AND MARIAT, F.
Une nouvelle bactérie, hôte du poirier.
(A new bacterium parasitic on pear trees.)
[German and English summaries 5 ll.]
Landw. Jb. Schweiz., 1948, 62: 786-90, bibl. 4, illus.

An organism isolated from a diseased pear twig is described and named *Aplanobacter fleuryi* Mariat. It is considered to be parasitic, causing injury rather like that of fire blight, but less severe. Control measures are not mentioned.

232. THORNBERRY, H. H., ANDERSON, H. W., AND POWELL, D.
Observations on peach bacterial spot in Illinois in 1948.
Plant Dis. Repr., 1948, 32: 306-7, bibl. 4.

Notes on the incidence of spring cankers (blister lesions) on peach twigs and on overwintering cankers on apricot twigs, caused by *Xanthomonas pruni*.

Fungi.

(See also 522.)

233. GREGORY, P. H.
The multiple-infection transformation.
Ann. appl. Biol., 1948, 35: 412-17, bibl. 11.

Attention is drawn to the possibility of misinterpreting results which may arise when the incidence of an organism is expressed as percentage presence or absence on plots of standard area. Examples are given of leaf diseases: (1) distributed at random (*Phytophthora infestans*), and (2) aggregated (*Gymnosporangium juniperi-virginianae* and *G. clavariaeforme*).—Rothamsted Experimental Station.

234. WENZL, H.
Zweigschäden durch *Sclerotinia laxa* an Marille. (Apricot twig blight caused by *S. laxa*.) [English summary ½ p.]
PflSchutz Ber., 1948, 2: 140-4.

An infection of apricot twigs is caused by *Sclerotinia laxa*, which first infects the fruit and then extends into the twigs to cause a dying-back. Sometimes the damage is not noticeable externally but when an affected twig is cut a brown stripe of dead tissue is seen to extend as much as 30 cm. upwards and downwards from the point of attachment of the infected fruit. Rotting fruit should be removed before infection has reached the twigs.

235. NAJJAR, H.
The brown rot of apricots. [Arabic. English summary ½ p.]
Circ. Ext. Serv. Syrian Minist. nat. Econ. Damascus 3, 1947, pp. 14, illus.

Brown rot [*Sclerotinia laxa*] is a serious disease of apricots in Syria. It causes twig blight and branch cankers. It rarely damages apricot fruits but is prevalent on peaches. The usual sanitary measures are recommended together with the application of bordeaux mixture or lime-sulphur 1 : 50, as the buds begin to swell, with a second application 10 days later if necessary.

236. RENOUF, L. R.
Verticillium wilt of apricots.
N.Z. J. Agric., 1948, 77: 284.

Verticillium dahliae has been causing damage to apricots in the Alexandra district of New Zealand during recent years. In each instance where infection has been found tomatoes have been grown in the ground, either before apricots were planted or between the trees after planting. It is believed that the fungus was introduced in this way, and it is advised that apricots should not be planted in ground previously used for growing tomatoes, and that tomatoes should not be planted among apricot trees.

237. SMITH, W. P. C., HARVEY, H. L., AND GOSS, O.
Apple scab outbreaks season 1947-48, with special reference to the introduction of the disease by infected buds on imported nursery stock.

J. Agric. W. Aust., 1948, 25: 129-35, bibl. 5, illus.

Available evidence indicates that outbreaks of apple scab in Western Australia have originated from imported nursery stock. Bud-scale infections were found on Pomme de Neige seedling stocks from Tasmania, and Northern Spy stocks and the Cleopatra variety from Victoria, imported in 1947. It is considered that the best method of excluding apple scab from Western Australia is to use stock propagated there.

238. FISHER, H.
Der Gitterrost der Birnbäume und seine Bekämpfung. (Cluster cup [*Gymnosporangium sabinae*] of pears and its control.)
Schweiz. Z. Obst- u. Weinb. 1948 57: 359-62 being *Flugschr. eidg. Versuchsanst. Obst- Wein- Gartenb. Wädenswil* 8.

The only effective control measure is the elimination of all infected junipers, the alternate host of the pear rust fungus. In several cantons of Switzerland this measure has been made compulsory by law. Nurseries should pay special attention to the freedom from rust of the juniper trees they despatch.

239. COLE, J. R.
Results of eleven years' spraying for pecan scab control with high-lime and low-lime bordeaux mixture.

Phytopathology 1948 38: 552-5 bibl. 14.

In spraying tests with 6-2-100 bordeaux mixture a 6-2-10 bordeaux plus summer oil emulsion and a 6-6-100 bordeaux against pecan scab (*Cladosporium effusum*) there was no significant difference in yield of nuts from the three mixtures, but differences between the sprayed and unsprayed trees were highly significant.

240. FELIX, E. L.
Preliminary studies in the control of strawberry fruit rots by fungicides.
Abstr. in *Phytopathology* 1948 38: 569.

None of seven fungicides tested appears promising for strawberry rot control except possibly copper carbonate against *Botrytis* grey mould.

241. ALEXOPOULOS, C. J., AND CATION, D.
Stem-end rot of strawberries.
Phytopathology, 1948, 38: 698-706, bibl. 32, illus.

A stem-end rot of strawberries, apparently caused by

Dendrophoma obscurans, the strawberry leaf blight fungus, was seen at Lawrence, Michigan, in 1947, 50-8% of all fruits picked from experimental plots being affected. The similarity between *Dendrophoma obscurans* and *Zythia fragariae*, the cause of strawberry leaf blotch in England [H.A., 15: 101], is discussed.—Michigan State College.

242. MILLER, P. W.
Studies on the cause of strawberry root rot in Oregon: second report of progress.
Plant Dis. Repr., 1948, 32: 309-16, bibl. 2, illus.

A number of different organisms, apparently weak parasites, are able to produce lesions on strawberry roots under greenhouse conditions. Desiccation of the roots during the digging and transplanting will cause a black root condition.

243. TIMS, E. C., AND OLIVE, L. S.
Two interesting leaf spots of fig.
Phytopathology, 1948, 38: 707-15, bibl. 6, illus.

Two rather conspicuous leaf spots of fig are caused by *Cephalosporium fici* nov. sp. and *Ormathodium fici* nov. sp.

244. LUTTRELL, E. S.
Physiologic specialization in *Guignardia bidwellii*, cause of black rot of *Vitis* and *Parthenocissus* species.
Phytopathology, 1948, 38: 716-23, bibl. 7, illus.

Cross inoculations have shown that *Guignardia bidwellii*, the cause of black rot of bunch grapes, muscadine grapes, Virginia creeper (*Parthenocissus quinquefolia*) and Boston ivy (*P. tricuspidata*), comprises three physiologic races differing in pathogenicity.

245. RUGGIERI, G.
Ricerche ed esperienze su una tracheoverticilliosi dell'olivo. (A verticillium dieback of the olive.) [English summary 15 ll.]
Ann. Sper. agrar., 1948, 2 [n.s.]: 549-56, bibl. 4.

The occurrence of *Verticillium albo-atrum* on the olive is limited to irrigated areas in Sicily where the olive is grown in association with tomatoes, eggplants, peppers and potatoes. Its symptoms are described. In this evergreen plant, contrary to its habit in cherries, plums, etc., the mycelium passes from the old to the new annual wood ring so that the host does not have the recuperative power shown by cherries and plums. This complicates control and the only advice which can at present be given is not to grow susceptible plants close to the olive.—Staz. Pat. veg. Rome.

246. BALDASSINI, C.
Di un'alterazione di polloni di castagno dovuta ad una specie di *Endothia*. (An alteration of chestnut shoots due to an *Endothia* species.) [English summary 9 ll.]
Ann. Sper. agrar., 1948, 2 [n.s.]: 677-85, bibl. 17, illus.

The agent is identified as *Endothia fluens* hitherto reported in Italy as a saprophyte only. It appears to attack chestnut when plants are weakened by lack of

nutrients. The shoots decay and finally die.—Fitopat., Florence.

Nematodes.

247. SMITH, W. P. C., AND HARVEY, H. L.
The control of root-knot or eelworm-gall disease by soil fumigation with D-D.
J. Agric. W. Aust., 1948, 25: 283-90.

Root-knot affects most vegetables, fruit trees, and ornamentals, as well as many pasture plants and common weeds. For soil treatment D-D should be applied in holes 6 to 8 inches deep and spaced one foot apart but not opposite one another in the rows, which are also one foot apart. A dosage of 2½ c.c. of D-D per hole is adequate.

248. NEWHALL, A. G., AND LEAR, B.
Soil fumigation for nematode and disease control.
Bull. Cornell agric. Exp. Stat. 850, 1948, pp. 32, illus.

The principal materials for fumigating soil are chloropicrin, mixtures of dichloropropenes and dichloropropanes, fumigants containing ethylene dibromide, and methyl bromide. Chloropicrin and methyl bromide are most important in the control of several destructive pests in greenhouses and nurseries, and directions are given for their use in fumigating small quantities of soil for damping-off and weed control. The results of field tests and the cost of fumigating soils are presented.

249. ELLIS, D. E., AND CLAYTON, C. N.
Soil treatments with new insecticides ineffective in control of root-knot.
Plant Dis. Repr., 1948, 32: 476-7.

Under the conditions of the test described, benzene hexachloride, DDT Parathion, Chlordane, and chlorinated camphene failed to reduce appreciably the incidence of root-knot [nematode] in okra and snap bean.

250. THORNE, G.
Nematodes as a disturbance factor in greenhouse, plot and field experiments.
Plant Dis. Repr., 1948, 32: 473-5.

The hazards of selecting experimental sites and soils without a previous check on the presence of plant pathogenic nematodes, are pointed out. Instances illustrating the complexity of the problem include the following: Slow decline of citrus studied for many years, from the standpoint of soil fertility and element deficiency, was finally found to be linked with enormous populations of the citrus nematode, *Tylenchulus semipenetrans*. Apple trees suffering from a baffling, slow decline were at length found to be infected with a species of *Pratylenchus*. Fig trees suffering from premature leaf and fruit drop were discovered to be infected by myriads of *Paratylenchus*.

251. VAN DER LINDE, W. J., SMITH, A. J., AND NEETHLING, L. J.
Control of eelworm.
Fmg S. Afr., 1948, 23: 509-16, 546, illus.

Two means of control are described: (1) the use of D-D and (2) cultural methods. The use of D-D in

seed beds is recommended and instructions are given for its use. D-D must not be applied if the ground temperature is below 40° F., or above 70° F., at a depth of 8 in.—Dep. of Agric., Union of S. Africa.

252. HASTINGS, A.

An electrical soil steriliser.

Reprinted from the *Commercial Gardeners' Journal* [N.Z.], 1948 (?), 1 p., illus.

A description of a portable unit of English origin with directions for use.

Mites and insects.

(See also 196, 680.)

253. MINISTRY OF AGRICULTURE, LONDON.

Red spider. Crops in the open.

Adv. Leaf. Minist. Agric. Lond. 226, 1947, pp. 3.

The nature of the damage caused by red spider (*Tetranychus telarius* L.), and measures for its control on hops, strawberries and violets, are described.

254. VAN CAUWENBERGH, E.

La lutte contre l'araignée rouge, dans les serres à vignes et à pêcheurs, avec l'azobenzène. (The control of red spider on vines and peach trees in greenhouses with azobenzene.)

Fruit belge, 1948, 16: 113-16.

Trials in Belgium have shown that azobenzene can be successfully used for the control of red spider on vines and peaches under glass, and two methods of volatilizing it are described. A control method suggested involves spraying with 6% mineral oil at bud burst, spraying with 1% mineral oil or fumigating with azobenzene when the shoots are 12 to 15 cm. long, with another fumigation 10 days after thinning.

255. MORRIS, H. M.

Annual report of the entomologist [Cyprus] for 1947.

A.R. Dep. Agric. Cyprus for 1947, Appendix III, pp. 8.

Under "Experiments and Investigations" are included notes on the vine bud moth (*Theresimima ampelophaga*), grape berry moth (*Polychrosis botrana*), olive moth (*Prays oleellus*), Mediterranean fruit fly (*Ceratitis capitata*), olive fly (*Dacus oleae*), and almond wasp (*Eurytoma amygdali*).

256. MANIS, H. C.

Earwig control.

Mimeo-leaf. Idaho agric. Exp. Stat. 104, 1947, 2 pp.

Earwigs are easily controlled by DDT if applied in the places where they congregate. Best results are obtained with 4 lb. of 50% wettable DDT powder in 100 gal. water applied with a power spreader at a pressure of at least 400 lb.

257. ALLMAN, S. L., AND WRIGHT, J. A.

Grasshopper control. Recent developments.

Agric. Gaz. N.S.W., 1948, 59: 233-6, 283-8, 345-9, bibl. 12, illus.

Poison bran bait, particularly the benzene hexachloride mixture, is very effective but not popular, and direct methods of control by the newer insecticides

have advantages. Tests carried out in New South Wales suggest that aerial distribution of insecticides is more suited to crop protection than the control of hopper swarms in grazing country. Insecticidal fogs produced on the ground may be drifted over massed hopper swarms. Chlordane is very effective as dust, spray, or aerosol, at 1-2 lb. per acre. Benzene hexachloride at 1-1½ lb. per acre was outstanding as an aerosol for the treatment of massed swarms. It was also satisfactory as a spray, but rather unreliable as a dust.

258. ALLMAN, S. L.

Skin blemish of nectarines caused by plague thrips.

Agric. Gaz. N.S.W., 1948, 59: 423-5, illus.

A blemish found on nectarines in New South Wales is caused by the plague thrips, *Thrips imaginis*. A single spraying with 0-1% DDT emulsion, applied when most of the petals have fallen, will obviate serious loss.

259. LAL, K. B.

Seasonal history and field ecology of the woolly aphid *Eriosoma lanigerum* in the Kumaun hills [India].

Indian J. agric. Sci., 1947, 17: 211-18; bibl. 8.

This paper includes observations on the reaction of different apple varieties in India to woolly aphid attack. Experiments on stock-scion interaction showed that the resistance, or susceptibility, of a variety is not influenced by its union with a variety having the opposite characteristic.

260. GONDÉ, M.

L'aspect technique de la reconstitution du vignoble tunisien. (The rehabilitation of vine growing in Tunisia.)

Rev. Vitic., 1947, 93: 291-3.

Tunisian growers are engaged in the reconstruction of their vineyards on phylloxera-resistant rootstocks, the ravages of the pest having begun to assume critical dimensions since 1936.

261. DELMAS, —, AND COUTIN, R.

Action toxicologique de divers insecticides sur les adultes du capnode (*Capnodis tenebrionis* L. Col. Buprestidae). (The toxicity of various insecticides towards capnodis.)

C.R. Acad. Agric. Fr., 1948, 34: 781-2.

In the trials with the adult beetles described, DDT, HCH, SPC (polychlorocyclane sulphide) and lead arsenate proved unsatisfactory; only SNP (mixed thiophosphate of diethyl and paranitrophenyl) showed any definite toxicity.

262. VAYSSIÈRE, P.

Sur le *Capnodis tenebrionis* des arbres à noyaux. (*Capnodis* on stone fruit trees.)

C.R. Acad. Agric. Fr., 1948, 34: 845.

A brief note stating that capnodis is causing great losses in the Mediterranean regions. HCH compounds are said to have given encouraging results for control.

263. ROSELLA, E.

Lorsque les arbres à noyaux se dessèchent en été. (Dieback of stone-fruit trees in summer.)

Progr. agric. vitic., 1948, 130: 78-81.

The causes of dieback ("apoplexie") in stone-fruit

trees in the Roquevaire region of the Bouches-du-Rhône department in the south of France are various, but one of the chief is the wood-boring beetle *Capnodis tenebrionis*, which attacks the almond, cherry, plum, peach and apricot. Control measures recommended are the injection of methyl bromide or methyl dibromide (preferably the latter) into the soil at the base of affected trees in autumn. There is risk of damage if the operation is done in spring.

264. ROSELLA, E.

Le *Capnodis tenebrionis* au Maroc: on l'accuse parfois à tort. On pourrait augmenter la résistance des arbres. (*Capnodis* in Morocco sometimes wrongly accused.

Necessity for increased tree resistance.)

C.R. Acad. Agric. Fr., 1948, 34: 845-8.

Lorsque les arbres à noyaux meurent prématurément on accuse trop souvent le capnode. (*Capnodis* not always guilty).

Progr. agric. vitic., 1948, 130: 165-8.

The author considers that the failure of stone-fruit trees in Morocco, usually attributed to *capnodis*, is often due to faulty cultural treatment, and particularly the use of unsuitable rootstocks. Thus under the climatic conditions of that country, (1) plum is an unsuitable rootstock for apricot, as it reduces both vigour and resistance to *capnodis*, (2) In irrigated dry soils peach on peach seedling rootstocks is less resistant than when on almond, (3) Under irrigation Mahaleb is an unsuitable rootstock for cherry.

265. CHISHOLM, R. D., AND MASON, A. C.

Ethylene dibromide-chlordane dip for treating plant balls infested with various stages of the Japanese beetle.

Publ. U.S. Dep. Agric., agric. Res. Administ.

Bur. Ent. Pl. Quar. E-757, 1948, pp. 2.

The ingredients and method of preparing and keeping this dip for the treatment of balled or potted plants against the Japanese beetle are detailed. The stock solution, for dilution before use, consists of ethylene dibromide 1 lb., chlordane (technical) $\frac{1}{2}$ lb., Cellosolve $\frac{1}{2}$ lb., Tween 20 $\frac{1}{2}$ lb., isopropyl alcohol (99%) to make 1 gallon.

266. MASSEE, A. M.

The apple-blossom weevil and its control.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 60-1.

Control by DDT either alone or by addition to a winter wash in February or March.

267. WALLACE, C. R.

A new poison bait for black beetle.

Agric. Gaz. N.S.W., 1948, 59: 435.

A new poison bait for *Heteronychus sanctae-helenae*, a pest of vegetables and certain fruits [H.A., 17: 133], has given outstanding results. It is inexpensive and easily prepared, its only ingredients being broken maize grain and an insecticidal dust containing benzene hexachloride (gamma isomer). Cultivated land found to be infested with beetles during the winter could be baited as soon as the beetles become active in spring. The bait should be broadcast, $\frac{1}{2}$ bushel per acre being suggested.

268. ANDISON, H.

Control of the western raspberry fruitworm in British Columbia.

Processed Publ. Canad. Dep. Agric. Div.

Ent. 79, 1948, 4 pp., illus.

The western raspberry fruitworm, *Byturus bakeri* Barber, a serious pest of loganberries and raspberries in the lower Fraser Valley, British Columbia, and the damage it causes are described. The control method recommended is to apply sprays or dusts containing rotenone (derris or cubé) to kill the beetles before they lay their eggs. DDT preparations show promise of giving good control. DDT 3% dust or a spray containing $1\frac{1}{2}$ lb. of a DDT 50% spray powder per 100 gal. of water gave excellent control.

269. ANDISON, H.

Control of root weevils in British Columbia.

Processed Publ. Canad. Dep. Agric. Div. Ent.

78, 1948, pp. 5, illus.

Root weevils (*Brachyrhinus* spp.) cause damage to strawberries, raspberries, loganberries, blueberries and grapes. Their life-histories are outlined. The damage can be lessened by setting out new plantings as far from old ones as possible. Crop rotation should be practised, and planting after grass or clover sod should be avoided. In an infested plantation satisfactory control can be obtained with a poison bait consisting of raisins 50 lb., shorts 50 lb. and sodium fluosilicate 5 lb. Details of preparing and applying the bait are given.

270. KUENEN, D. G.

Bestrijding perebloesemkever. (The control of pear blossom weevil.)

Fruittel, 1948, 38: 588-9, illus.

The habits of, and damage caused by, the pear blossom weevil, *Anthonomus pyri*, are outlined and control measures discussed. When weevil damage is seen the trees should be sprayed with DDT. The warning issued by the Dutch Advisory Service can generally be expected about 10 September.

271. CUISANCE, P.

La lutte contre les hannetons et les vers blancs. (The control of cockchafers and their larvae.)

Progr. agric. vitic., 1948, 130: 238-40.

The adult cockchafers can be controlled by sprays or powders containing DDT, HCH or SPC. Against the larvae the soil should be thoroughly cultivated, particularly the top 10 cm., and insecticides should be incorporated in it, for which purpose HCH and SPC have shown themselves superior to DDT.

272. ENTOMOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.

Tree borers.

Agric. Gaz. N.S.W., 1948, 59: 369-74, 90, illus.

Tree boring insects are described and illustrated. Those destructive to fruit trees in New South Wales are the fig longicorn (*Dihammus vastator*), elephant beetle (*Orthorrhinus cylindrirostris*), fig twig-borer (*Hylesinus fici*), auger beetle (*Bostrychopsis jesuita*), and fruit-tree moth borer (*Maroga unipunctata*). Control of the caterpillars of the fruit-tree moth borer

may be obtained by removing the mass of webbed material from the bark to expose the tunnel opening, and then inserting a piece of pliable wire, and twisting it around to kill the caterpillar. Another method is to inject a few drops of kerosene into the tunnel to cause the caterpillar to crawl out, when it can be destroyed. Other borers can be reduced in numbers by removing and burning heavily infested limbs. Painting the trunks and limbs with bluestone paint in spring is recommended. A naphthalene tree-borer repellent is also mentioned.

273. SMIT, B.

Codling moth in pome fruits.

Fmg. S. Afr., 1948, 23: 517-18, 552.

Tentative suggestions are made for applying DDT in a spray programme suitable for highveld orchards in the summer rainfall areas of South Africa.

274. STUBBINGS, W. A. K.

Should lead arsenate be used in codling moth control?

Fmg. S. Afr., 1948, 23: 627-8.

The limitations of lead arsenate for codling moth control are pointed out; it should now be excluded from the programme for the control of that pest, and replaced by DDT.

275. NAJJAR, H.

Controlling the leopard moth. [Arabic. English summary.]

Circ. Ext. Serv. Syrian Minist. nat. Econ., Damascus, 25, 1948, pp. 10.

The leopard moth (*Zeuzera pyrina* L.) is a serious pest of apple, quince, olive, and pomegranate in Syria. It tunnels into the wood of the stem, branches and twigs. Killing the larvae in the tunnels with a wire or a thin twig is useful in the early stages of tunnelling. For advanced cases it is recommended that paradichlorobenzene in the form of a paste or crystals or a few drops of petrol be put in the tunnel and the entrance closed with grafting wax or mud.

276. NAJJAR, H.

The Mediterranean fruitfly. [Arabic. English summary.]

Circ. Ext. Serv. Syrian Minist. nat. Econ., Damascus, 28, 1948, pp. 13.

The Mediterranean fruitfly (*Ceratitis capitata*) is a serious pest in Syria, particularly on the midsummer crop of peach, though it also attacks certain varieties of apple and pear. Its life history is outlined and the following control measures are recommended: (1) collection and deep burial of infested fruit, (2) spot-spraying the trees with a poison bait consisting of sodium fluosilicate 250 g., molasses 12 kg., water 100 l., three times a month.

277. BAILEY, S. F.

The peach twig borer.

Bull. Calif. agric. Exp. Stat. 708, 1948, pp. 56, bibl. 25.

The most important hosts of the peach twig borer, *Anarsia lineatella* Zell., in California are peach and almond. In epidemic years a 50% loss of peaches is common and 20% to 30% damaged almonds is frequent in the Sacramento Valley. The injury to the trees themselves is unimportant compared with the

direct damage by midsummer broods to the ripening fruit. Counter parasites include *Hyperteles lividus* (Ashm.), and the grain or itch mite, *Pediculoides ventricosus* (Newport), which attack the dormant larva. The chief control measure is by insecticides applied against the feeding larvae during early spring and in May, using particularly basic arsenate of lead, 3 to 4 lb. per 100 gal. water.

278. VAN ROSSEM, G.

De bladrollers van onze fruitgewassen.

(The tortrix moths of fruit trees.)

Fruiteelt, 1948, 38: 624-7, illus.

An account of tortrix moths of fruit trees, particularly three that attack both foliage and fruit, viz. *Capua reticulana* (on apple and pear), *Cacoecia podana* and *C. rosana* on peaches under glass. Little is known about control measures for these pests, but dinitro-cresol, or preferably DNC-DDT preparations applied in winter and DDT emulsion in summer are suggested.

279. MELIS, A.

Necessità di colpire gli individui della generazione carpofaga per ottenere risultati concreti nella lotta contro la tignola dell'olivo (*Prays oleellus* F.). (Successful control of the olive moth depends on attacking the carpivorous generation.) [English summary 10 ll.]

Ann. Sper. agrar., 1948, 2 [n.s.]: 701-25, bibl. 7.

Whereas attacks on the leaf and flower-eating larvae of the olive moth have proved somewhat unsuccessful, encouraging results were obtained by the use of arsenicals on the generation which attacks the fruit.

280. MINISTRY OF AGRICULTURE, LONDON.

Gooseberry sawfly.

Advis. Leaflet. Minist. Agric. Lond. 30, 1948, pp. 5, illus.

The gooseberry sawfly, *Pteronidea ribesii* Scop. and its life history are briefly described. Control can be effected with derris or lonchocarpus, DDT or lead arsenate, their preparation and application being outlined.

281. SCHENK, P. J.

Slakvormige bastaardrupsen.

(Sawfly larvae.)

Cult. Hand., 1948, 14: 556-8, illus.

A popular account of sawfly larvae, including those of the pear (*Caliroa limacina* Retz.) and of the rose (*Endelomyia aethiops* F.), and the damage caused. They can be controlled by slaked lime and powdered sulphur, and nicotine or derris preparations. DDT appears to be unsatisfactory. Where there is no danger of insecticide falling on vegetables a stomach poison may be used, such as 0.1% paris green with 1% lime.

282. JENKINS, C. F. H.

The Argentine ant (*Iridomyrmex humilis* Mayr.).

J. Agric. W. Aust., 1948, 25: 245-58, bibl. 11, illus.

The Argentine ant is a serious nuisance in orchards. Injury is not actually caused by the ants but they are attracted by the honey-dew given off by scale insects,

aphides, and mealy bugs, and so heavily infest trees carrying these pests. Affected trees should be trimmed free of the ground and the butts and main branches should be sprayed with a 2% DDT water mixture.

Other pests.

283. FAVARD, P.

Lutte contre les animaux souterrains nuisibles. (The control of underground animal pests.)

Progr. agric. vitic., 1948, 130: 136-40.

Notes on the control of rodents (particularly rats and field-mice), molluscs (snails, slugs), eelworms and various kinds of insect larvae. The use of the new synthetic insecticides for soil treatment is recommended.

284. MINISTRY OF AGRICULTURE, LONDON.

Grey squirrels (*Sciurus carolinensis*).

Advis. Leaflet. Minist. Agric. Lond. 58, 1948, pp. 4, illus.

Information is given on the introduction of this pest into Britain from N. America, its habits and food, the damage done to fruit and other trees, methods of control, and relevant legislation.

285. THOMPSON, R. W.

1. Control of rabbits [in Canada].

2. Mouse control in [Canadian] orchards. *Bulls. Ontario Dep. Agric.* 435 and 436, 1943, pp. 7 and 6, illus. [received 1948].

Bulletin 435 refers to the European hare, or "jack rabbit", and, to a lesser extent the smaller "cotton-tail" rabbit, which cause considerable damage to plantings of young fruit trees, ornamentals and shrubs, especially when snow is deep on the ground. Amongst the protective measures described are the use of burlap, wire netting and wooden guards. Of the various repellants available, the most effective is prepared from 12 lb. lump resin dissolved in 1 gal. alcohol, applied to the bush in autumn. Small trees may be covered completely as the solution does not injure the buds. Instructions are given for preparing poison baits.

Bulletin 436 refers to the common meadow mouse, the only one causing serious damage in Ontario orchards. Control measures consist of: the removal of litter from base of trees; packing 4 in. of cinders or crushed stone around trees, under the guards; tramping snow around trunks; fixing wire, wood veneer, and asbestos paper guards; and the use of poisoned grain or apple baits, instructions for preparing which are given.

Sprays and spraying.

(See also 684, 695.)

286. GEMBLoux, STATION D'AMÉLIORATION DES PLANTS FRUITIERS.

Les traitements antiparasitaires du fraisier. (Pest and disease control on strawberries.)

Fruit belge, 1948, 16: 122-4.

Eight applications of fungicides (bordeaux mixture or lime-sulphur) and insecticides (nicotine, DDT or HCH) are recommended, from March to September. Treatments of runners before planting are fumigation

with methyl bromide against tarsonemid mite, and warm water treatment, particularly against eelworm.

287. FREW, S.

Controlling fruit pests and diseases.

N.Z. J. Agric., 1948, 77: 129.

The necessity for the correct timing of sprays, the use of reliable material at the correct strength, and thoroughness of application is stressed. A spray programme is presented for apples, pears, stone fruit (except apricots) and apricots. Special precautions to be taken in the case of red mites and brown rot of apricots are pointed out.

288. DEPARTMENT OF COMMERCE AND AGRICULTURE, MELBOURNE.

Overseas developments relating to mechanical equipment for orchard spraying.

Bull. Fm Mech. Serv. 10, 1948, pp. 17+3, illus.

A review of advances in hydraulic spraying and their implications. The subject is treated under: pumps, nozzles, spray guns and rods, pressure and its effects, factors in nozzle design, pressure losses in hose and rods, portable power sprays, stationary spray systems, portable pipe-line systems, and automatic spraying. The appendix gives tabulated data on (1) average rate of discharge from (a) a short gun adjusted for long-range spraying, (b) a multiple-nozzle gun, (c) a double nozzle 10 ft. bamboo rod, and (2) friction losses in pipes for various rates of flow.

289. LAPEYRONIE, A.

Traitements antiparasitaires par avion ou par hélicoptère. (Pest control by aeroplane and helicopter.)

Agron. trop., 1948, 3: 227-45, bibl. 42, illus.

A short historical summary of the subject is followed by brief particulars of the types of aircraft used, apparatus for distributing powders and sprays, suitable insecticides, size of particles, their fall and adherence, influence of atmospheric conditions, flying procedure. The pros and cons of the process are discussed. [The article is based mainly on bibliographic enquiry.]

290. DÜNNEBEIL, H.

Ein Vielfachgerät zur Schädlingbekämpfung. (A multi-purpose sprayer.)

Ceres, Hamburg, 1948, 1: 7/8: 13-15.

An illustrated description is given of a motor mist sprayer which can be readily converted into a dusting machine. The model was developed in Germany during the war.

291. STATENS FÖRSÖGSVIRKSOMHED I PLANTEKULTUR.

Försøg med Vinter- og Foraarssprøjtevaedsker til Frugttræer 1946-48. (Trials with winter and late-dormant washes 1946-48.)

Dansk Havebr., 1948, 7: 175-7, being *Meddel. Forsøgsvirks.* 427.

In comparative trials with 8-10% winter and late-dormant carbolineum washes and 6-8% DNC oils, winter carbolineum gave the best results against winter and tortrix moths, whilst DNC was least effective. Against red spider, however, the best control was obtained with DNC, late-dormant carbolineum being intermediate in both cases. DNC should not be used

where the control of apple sucker is intended. Detailed data are presented.

292. CHAPIRO, E.
Analyse rapide de produits phytopharmaceutiques. (The rapid analysis of plant protection products.)
Parasitica, 1947, 3: 159-62, bibl. 4; 1948, 4: 162, bibl. 3.

These two short articles describe methods for analysing arsenical products, agricultural polysulphides, and organic mercurials.

Fungicides.

293. MCCALLAN, S. E. A.
What every dealer should know about fungicides.
Prof. Pap. Boyce Thompson Inst., Vol. 2, No. 5, pp. 35-43, being reprinted from *Agric. Chem.*, 1948, 3: 23-5, 77, 79.

This article begins with a brief popular account of the causes of disease in plants, and then gives an account of the types of chemical products now in use or under trial against plant diseases, viz. sulphur, copper, and mercury fungicides, miscellaneous inorganics, and organic fungicides. It attempts to give the dealer a general background of technical information on fungicides.

294. ANON.
Stone and pome fruit diseases. Winter control is essential.
Agric. Gaz. N.S.W., 1948, 59: 363-8, illus.

The chief diseases of stone and pome fruit trees in New South Wales are described and illustrated. The most efficient semi-dormant protective spray to apply, following the recommended sanitation measures, is bordeaux mixture 15-15-100 plus $\frac{1}{2}$ gal. of white oil or pale oil. It is recommended for the control of all fungous diseases of stone fruits, including brown rot, rust, shot-hole, freckle and leaf curl. It should be applied at the late bud-swell stage, when the first signs of the pink of the blossoms become evident. The preparation of this modified bordeaux mixture is described in detail.

295. MASON, C. L.
A study of the fungicidal action of 8-quinolinol and some of its derivatives.
Phytopathology, 1948, 38: 740-51, bibl. 24.

In tests with 8-quinolinol and eleven of its derivatives, copper 8-quinolinolate was most effective, and had many properties desirable in a good plant protectant. In laboratory studies it has shown definite superiority over bordeaux mixture in fungicidal activity, and in field tests it had no noticeable harmful effect on apples, grapes, cherries or tomatoes. No serious injury was observed when peaches were sprayed with concentrations of $\frac{1}{4}$ lb. per 100 gal. of water.

296. D'ESTIVAUX, L. B.
La cuprosulfite de cuivre, anticryptogamique permanent pour la vigne. (Copper cuprosulphite as a permanent fungicide for the vine.)
Progr. agric. vitic., 1948, 130: 230-3, bibl. 3.

Bivalent copper cuprosulphite prepared by the author

has the formula $[\text{Cu}(\text{SO}_3)_2]_2 \text{Cu } 2\text{H}_2\text{O}$. From his experiments he concludes that in powders, colloidal suspensions, or spray fluids, it deserves large-scale trial for disease control on vines, fruit trees and plants generally.

297. TILLEMANS, M. E.
Mode d'action du soufre. (The action of sulphur.)
Fruit belge, 1948, 16: 148-51.

The dispersal of sulphur, particularly in relation to temperature, is discussed, and reference is made to its employment as a fungicide under the form of colloidal sulphur and polysulphides (e.g. lime-sulphur, potassium polysulphide, and barium polysulphide).

298. BRIAN, P. W., CURTIS, P. J., AND HEMMING, H. G.
Gladiolic acid, an antibiotic substance produced by *Penicillium gladioli* McCull and Thom.
J. gen. Microbiol., 1948, 2: 341-55, bibl. 9.

Gladiolic acid, produced by *Penicillium gladioli* (a weak parasite of *Gladiolus* corms), when grown on culture media, is highly fungistatic at low pH.—Imperial Chemical Industries. Research Laboratories Welwyn.

299. FLEURY, C.
Action de la thio-urée sur l'*Aspergillus niger*. Effet fungistatique. (The fungistatic action of thiourea on *Aspergillus niger*.)
Publ. Stat. féd. Ess. vitic. Lausanne 361, being reprint from *Bull. Soc. vaud. Sci. nat.* 1948 63: 463-82.

and

Action de la thio-urée sur l'*Aspergillus niger*. Rôle particulier joué par la source d'azote nitrique. (The action of thiourea on *Aspergillus niger*. The particular role played by the source of nitric nitrogen.) [Summary in French and German.]
Publ. Stat. féd. Ess. vitic. Lausanne 373, being reprint from *Bull. Soc. suisse Bot.* No. 58, 1948, pp. 462-77, bibl. 88.

The fungistatic effect of thiourea on *Aspergillus niger* is described and confirmed and the author concludes that thiourea in Raulin's solution containing sodium nitrate has a fungistatic effect at a concentration as low as 10^{-6} . The implications of this effect on the assimilation of nitrates by plants is discussed.

Insecticides.

(See also 71.)

300. MARTIN, H.
Some biochemical aspects of insecticide research.
Research, 1948, 1: 640-6, bibl. 39.

A review of some of the ideas which have guided recent work on insecticides, their speculative nature being emphasized. The attention given to successful work inspired by hypothesis is closer than that given to the failures.

301. PARR, H. C. M., AND BUSVINE, J. R.
A spinning-disk sprayer for applying residual insecticides.
Ann. appl. Biol., 1948, 35: 359-68, bibl. 2.

The apparatus consists essentially of a spinning disk which throws off liquid, applied to its centre, in the form of small droplets (about 0.1-0.4 mm. diameter). It can be used to coat surfaces up to 1 ft. square, with deposits of insecticides in oil solutions or in aqueous suspensions or emulsions.—London School of Hygiene and Tropical Medicine.

302. STUBBINGS, W. A. K.

Spray programme for pears and apples.

Fmg S. Afr., 1948, 23: 586-8, 628.

A suggested spray programme follows discussion of the advantages and disadvantages of lead arsenate, nicotine, cryolite, oil emulsion and DDT as insecticides. It is stated that the time has now arrived for South African growers to discard lead arsenate for codling moth control, for the insect in the western Cape Province has developed a degree of resistance to arsenic. Where growers intend to use DDT for codling moth control, precautions should be taken to reduce the orchard population of *Bryobia* mite during winter with a winter oil emulsion plus lime-sulphur or DNOC spray. If there is a rapid increase in the mite population in December, 1½ lb. DN-111 or ½ gal. Dynone per 100 gal. should be added in the 5th or 6th codling moth spray, and the same sprays may be used for red spider.

303. V. D. ZANDE, R., AND KRUIJK, P. A.

Ziektenbestrijding bei perzik en pruim onder glas. (Pest control on peach and plum under glass.)

Fruittelt, 1948, 38: 674.

It is stated that for peach and plum under glass winter spraying (the disadvantages of which are pointed out) can be omitted, and spraying 10 to 12 days before blossoming and again after the crop is harvested is advised. Details are given of preparations which may be used.

304. GREENSLADE, R. M.

Pestox III: A systemic insecticide.

Grower, 1948, 30: 1015-18.

A note on a promising organic phosphorus compound, containing bis-bisdimethylaminophosphonous anhydride, which penetrates the leaf and is carried in the sap stream of the plant, which thus becomes toxic to sucking insects, and red spiders—but not to leaf-eating caterpillars. It should not be used on food crops until the necessary toxicological tests are complete.

305. GOLDSWORTHY, M. C., AND WILSON, R. A.
Effect of soil applications of "Parathion" on the top growth of Blakemore strawberry plants.

Plant Dis. Repr., 1948, 32: 388-90.

The insecticide Parathion, O,O-diethyl, O,p-nitrophenyl thiophosphate, at the concentrations used (up to 100 lb. per acre), caused no deleterious effect. Growth was accelerated at every increase in concentration and at the highest level used this increase in growth was over twice that in the untreated soil.

306. ANON.

Parathion limits set by USDA.

Better Fruit, 1948, 43: 1: 11.

The limits of parathion dusts and sprays set by the U.S. Department of Agriculture vary with the pest to be controlled.

307. GUNTHER, F. A.

Sample manipulation and apparatus useful in estimating surface and penetration residues of DDT in studies with leaves and fruits.

Hilgardia, 1948, 18: 297-316.

Reliable methods are urgently required for estimating the amount of insecticide per unit area on fruit and foliage and especially for the assessment of these values on field sprayed material. The difficulties involved are increased with toxicants such as DDT which are partially absorbed both by the fruit and leaf tissue. A useful start in this work is reported in this paper. Empirical techniques are described for studying the magnitude of both penetration and surface residues of DDT. Field sampling methods for fruit and leaves are given. The leaf areas are measured by a photo-electric arealimeter, the fruit surfaces being estimated by means of numerical tables in which measurement of the major and minor axes are translated with the areas involved. The surface residual DDT was removed from the leaf or fruit by stripping with benzene, the DDT which had penetrated the tissues being extracted by a Soxhlet technique. After extraction and evaporation of the solvent, the DDT was estimated by the dehydrohalogenation method using an electrometric technique for determining the end point in the chloride titration. J.K.E.

308. BARRY, G. T., AND BOYER, R.

The synthesis and biological toxicities of some DDT homologues and related compounds.

Canad. J. Res., 1948, 26, Sec. B, pp. 511-17, bibl. 14.

None of the compounds synthesized was found to be superior to DDT as a contact insecticide.—McGill University, Montreal.

309. VAN CAUWENBERGHE, E.

L'emploi du D.D.T. en arboriculture fruitière et en pépinières. (The use of DDT in orchards and in nurseries.)

Fruit belge, 1948, 16: 155-9.

The author records results of trials with DDT against aphids (control up to 90% but never 100%), woolly aphis (negative), red spider (not only negative but increased intensity of attack owing to death of parasites), the leaf weevil *Phyllobius oblongus* on pears in the nursery (favourable, and to be recommended), codling moth larvae (results about as good as those with lead arsenate).

310. GOLDSWORTHY, M. C.

Effect of technical DDT, incorporated in quartz sand and soils, on the growth of peach trees.

Plant Dis. Repr., 1948, 32: 437-41, illus.

The experimental data tabulated show that 1-year-old Elberta peach trees, budded on seedling peach stocks are sensitive to very small quantities of technical DDT when the seedling roots are grown in nutrient solutions in contact with the chemical mixed with quartz sand. It is estimated that as little as 25 lb. per acre reduces root and top growth of peach tree. The size of the root system is reduced and the secondary roots fail to produce small fibrous rootlets.

311. PASTAC, J.
Le DDT et les gaz de combat. (DDT and war gases.)
Reprinted from *Rev. gén. Sci.*, 1946, 53: 141-3.

The chemical structure of DDT and of gases used in chemical warfare is discussed, and the possible value of the gases as insecticides is hinted at.

312. SMITH, F. F., BRIERLEY, P., AND FULTON, R. A.
Responses of some plants to DDT, hexaethyl tetraphosphate, and parathion applied as aerosols.
Proc. Amer. Soc. hort. Sci., 1948, 51: 327-32, bibl. 19.

Results with a large number of plants under glass were, generally speaking, highly successful. The improved growth of roses following control of spider mites by hexaethyl tetraphosphate was so striking as to suggest a stimulatory action. Tomato and chrysanthemum showed some injury. While insecticidal aerosol treatments obviously demand care, the ease of application and the high toxicity involved make such treatment extremely promising.—Beltsville, Md.

313. BOISCHOT, P., AND HÉBERT, J.
Fixation des arsénates par le sol. (The fixation of arsenates by the soil.)
Ann. agron., Paris, 1948, 18: 426-48, bibl. 7.

The authors found that arsenates are fixed in the top layers of the soil and that a concentration of 60-100 kg. As_2O_5 in the top 2 in. is harmful to soil organisms. Ordinary spraying and dusting will normally not result in the accumulation of arsenic compounds near the danger limit, but the control of soil pests, such as Japanese beetle larvae, at dosages recommended in America should be discouraged. Excessive application of arsenates on soils with a low lime and clay content, which have a very limited fixing capacity, may result in the pollution of springs by percolation. The investigation was carried out at Versailles.

314. BARON, C.
Esters phosphoriques. (Phosphoric esters.)
Fruit belge, 1948, 16: 177-81, bibl. 9.

The structural formulae of certain phosphoric esters, and the insecticidal properties of hexaethyl tetraphosphate (HETP) tetraethyl phosphate (TEPP) and diethyl-nitrophenyl-thiophosphate (Parathion) are discussed.

Insecticidal plants.

315. CHAMBERLAIN, E. E., AND CLARK, P. J.
Investigations on growing pyrethrum in New Zealand.* II. Selection of clones: their variation in habit of growth, susceptibility to root-rot, yield and pyrethrin content of flowers.
N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp. 215-22, bibl. 5, illus.

Thirty-nine clonal lines of pyrethrum, obtained from selected seedlings by vegetative propagation, differed in growth habit, susceptibility to root-rot, yield and

pyrethrin content of flowers. Two clones superior to average seedling plants are described.

316. CLARK, P. J., CHAMBERLAIN, E. E., AND PROCTER, C. H.
Investigations on growing pyrethrum in New Zealand. III. Factors influencing pyrethrin content of flowers.
N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp. 223-32, bibl. 23, illus.

Analyses showed a progressive increase in pyrethrin content with development of pyrethrum flowers from the small bud to fully opened stage. Content of stems of two clonal lines were 14% and 25% respectively that of their flowers. Drying the flowers at 132° F. for 9 hours slightly reduced pyrethrins; lower temperatures had no adverse effect. In two samples fungous infection of flowers caused 25% and 49% reduction of pyrethrins respectively.

317. HOPKINS, J.
A note on the deterioration of the toxic content of separated pyrethrum achenes compared with that of whole flowers.
E. Afr. agric. J., 1948, 14: 36-7, bibl. 2.

It has been suggested that by separating the achenes (which contain 90% of the pyrethrins) from the rest of the flower-head considerable saving could be made in transport costs. An experiment, using miniature bales, is reported from which it is evident that the rate of deterioration of the pyrethrum content of separated pyrethrum achenes is greater than that of whole flowers when both are baled and stored under identical conditions and that, although antioxidants can be used to retard this deterioration, achenes so treated will tend to deteriorate more rapidly than whole flowers.

318. ANON.
Derris in Ecuador.
Foreign Agric., 1948, 12: 230-1, illus.

A short general note which includes references to the use of a tractor-drawn 6 ft. brush mower for cutting derris vines and a terracer for digging the roots.—Co-op. Agric. Stat., Pichilingue.

Noted.

319. a ANON.
Orchard spray recommendations for Idaho.
Ext. Circ. Idaho agric. Exp. Stat. 96, 1947, folded sheet.
b BIRAGHI, A.
Prove di inoculazione di castagni con *Endothia* sp. isolata in Biscaglia. (Inoculations of chestnut trees with *Endothia* sp. isolated at Biscaglia, Spain.) [English summary 10 ll.]
Ann. Sper. agrar., 1948, 2 [n.s.]: 687-91. Actually *E. parasitica*.
c BROADBENT, L., AND OTHERS.
Equipment used for trapping and identifying alate aphides.
Proc. roy. ent. Soc. Lond. (A) 23, 1948, parts 4-6, pp. 57-8.

* For Part I of this series see *H.A.*, 18: 437.

- d BROADBENT, L.
An analysis of captures of aphididae (*Hemiptera*) in a light trap.
Trans. roy. ent. Soc. Lond., 1947, **98**: 475-90, bibl. 14.
- e BUSSART, J. E., AND SCHOR, A.
Chlordane.
Soap san. Chem., 1948, **24**: 8: 126-8.
Uses of the insecticide are reviewed.
- f CHRISTIE, J. R.
A description of *Aphelenchoides besseyi* n. sp., the summer-dwarf nematode of strawberries, with comments on the identity of *Aphelenchoides subtennis* (Cobb, 1926) and *Aphelenchoides hodsoni* Goodey, 1935.
Proc. helminth. Soc. Wash., 1942, **9**: 82-4, bibl. 6 [received 1948].
The author concludes that *Aphelenchoides hodsoni* is a synonym of *A. subtennis* and that the nematode causing summer-dwarf of strawberries is a new species.
- g JUUSELA, T.
Untersuchungen über den Einfluss des Entwässerungsverfahrens auf den Wassergehalt des Bodens, den Bodenfrost und die Bodentemperatur. (The effect of drainage on soil water content, ground frost and soil temperature.)
Suom. Maataloust. Seur. Julk., 1945, **59**: 3-212, bibl. 101 [received 1948].
- h MASSEE, A. M.
Spraying in the fruit garden.
J. roy. hort. Soc. Lond., 1949, **74**: 7-12.
- i MEHTA, P. R., AND BOSE, S. K.
A leaf-spot disease of fig (*Ficus carica* L.) caused by *Cylindrocladium scoparium* Morg.
Indian J. agric. Sci., 1947, **17**: 219-21, bibl. 9, illus.
Cylindrocladium is hitherto unrecorded from India.
- j MEIJER, T. M., AND RACHMAD, A.
Colorimetric evaluation of derris root.
Analyst, 1948, **73**: 108-9, being abstr. from *Rec. Trav. Chim.*, 1947, **66**: 312-16.
- k MINISTRY OF AGRICULTURE, LONDON.
Spraying programme for apples and pears. *Advis. Leaflet. Minist. Agric. Lond.* **332**, 1948, pp. 3.
- l MINISTRY OF AGRICULTURE, LONDON.
Officially approved insecticides and fungicides. *Agriculture*, 1948, **55**: 364.
A supplementary list, of 15 products, dated 13.10.48.
- m MORGAN, W. L.
The heliothis caterpillar (*Heliothis armigera*). *Agric. Gaz. N.S.W.*, 1948, **59**: 477, illus.
Description and control.
- n NAJJAR, H.
Whitewashing of fruit trees. [Arabic. English title.]
Circ. Ext. Ser. Syrian Minist. nat. Econ., Damascus, 6, 1947, pp. 6, illus.
- o NICHOLAS, D. J. D.
The application of rapid chemical tests to the diagnosis of mineral deficiencies in horticultural crops. I. Crops grown on a manurial trial. II. Crops grown at various centres. *J. hort. Sci.*, 1948, **24**: 72-105, 106-22, bibl. 51 and 7.
- p SHULL, W. E., AND MANIS, H. C.
The oriental fruit moth [*Grapholitha molesta*]. *Ext. Circ. Idaho Coll. Agric.* **86**, 1945, 8 pp., illus. [received 1948].
Damage and control.
- q SPOON, W.
De voorziening met derriswortel voor en na den oorlog. (The supply of derris before and after the war.) [English summary $\frac{1}{2}$ p.] *Ber. Handmus. kolon. Inst. Amst.* **217**, pp. 5, reprinted from *Econ. Weekblad. Indonesië*, 1947, **13**: 16: 253, bibl. 16.
- r STARK, F. L.
Investigations of chloropicrin as a soil fumigant.
Mem. Cornell agric. Exp. Stat. **278**, 1948, pp. 61, bibl. 34, illus.
In laboratory and greenhouse.

WEEDS AND WEED CONTROL.*

(See also 66, 78, 576, 577, 588.)

Particular weeds.

320. MILTON, W. E. J.
The buried viable-seed content of upland soils in Montgomeryshire.
Emp. J. exp. Agric., 1948, **16**: 163-77, bibl. 24.
Concerns the appearance of typical arable weeds following potatoes grown on newly-broken, natural, hill grasslands which had not been cultivated before.
321. ANDERSON, E. G.
Poison ivy and its eradication.
Leaflet. (out of series) Canada Dep. Agric., Div. Bot. Plant Path., 1948, pp. 3, illus.
Contains short notes on identification, toxic principle,
* Among temperate and tropical crops.

and preventive measures, as well as an outline of control methods, mechanical and herbicidal. The ester type of 2,4-D has generally been superior in tests to other types.

322. CORNS, W. G.
Translocation of 2,4-D in injected flowering perennial sow thistle plants.
Canad. J. Res., 1948, **26**, Sec. C, pp. 239-48, bibl. 17.
Injection of single new flower heads of perennial sow thistle plants with herbicidal concentrations of 2,4-D resulted in localized response to treatment. The stimulus moved down the peduncles of treated flower heads and up several neighbouring peduncles indicating that translocation of 2,4-D is associated with flow of

liquid to active centres of development or of transpiration. Injection of severed stems of perennial sow thistle plants with 2,4-D resulted in extensive kill of intact lateral branches and leaves and of root growth. Multidirectional movement of selective herbicide is thus shown to occur. If the above results are applicable under practical conditions of application of selective herbicide, it would be advisable, prior to chemical treatment of flowering sow thistle plants growing on uncropped land, to mow them at a height of several inches above ground. [From author's summary.]—University of Alberta, Edmonton, Alta.

323. SPENCER, J. R.

Control of bindweed by the use of 2,4-D and cultural methods.

Press Bull. New Mexico agric. Exp. Stat. 1021, 1948, pp. 7, duplicated.

Recommendations are made based on: one properly applied spray of 2,4-D, deep ploughing, grazing of bindweed by sheep, planting thick crops that will shade and smother the weed.

324. PARHAM, B. E. V.

Weed control studies in Fiji. I. Methods and materials. II. Eradication of water hyacinth and other aquatic weeds.

Agric. J. Fiji, 1947, 18: 35-42, bibl. 13.

The efficacy of hormone products for the control of water hyacinth, pickerel weed, wakumala or kankun, and willow primrose is established. The most effective of these materials appear to be weedone and phenoxyl. Agroxone is highly effective but it is inclined to run off their glabrous foliage: mixed with small quantities of DNC compounds its effect is enhanced. While lower concentrations have proved reasonably effective it is recommended that solutions of 0.15% are most suitable. Spraying should be carried out in fine weather and all accessible leaves wetted. Coverage rate varies according to the size and density of the weed growth—small plants may be thoroughly wetted with applications of 80-120 gallons per acre, whereas large plants may require up to 250-300 gallons per acre. The action of these herbicides is usually delayed but in the case of aquatic weeds it is visible within a day or two of application. Treated areas should be inspected two to three weeks after spraying and any surviving plants sprayed. The aim should be complete eradication in each site, as a few plants, however small, will rapidly reinfest the area. Expenditure on partial destruction of water hyacinth is uneconomic, as within a year the work has to be done again. The practical elimination of this plant from the waterways of the Colony would appear to be no longer a serious annual problem.

325. DOMATO, J., AND ARAMAYO, H.

Las hormonas y sus posibles aplicaciones en la agricultura. El 2-4D ensayado como herbicida en el control de la "totorilla" (*Cyperus rotundus* L.). (Hormones and their possible application in agriculture. 2,4-D tested as a herbicide in the control of nut-grass (*Cyperus rotundus* L.))

Bol. Estac. exp. agric. Tucuman 62, 1947, pp. 18, illus.

The leaves of nut-grass, and its growing points within

5 cm. below the surface of the ground are destroyed by the application of 2,4-D. Regrowth occurs from tubers at a greater depth. Whether 2,4-D can be used to eradicate this weed depends on the number of times treatment must be repeated before reserves in the deeper tubers are exhausted; this has not yet been determined. The susceptibility of various weeds and cultivated plants is indicated.

326. TAMHANE, V. A., AND TAMHANE, R. V.

The eradication of Kans (*Saccharum spontaneum*).

Indian Fmg., 1947, 8: 237-8.

A record of a small-scale experiment in which this weed appears to have been eradicated by repeated harrowings with an "iron blade harrow", i.e. twice a week for 8 months [a costly method ?].

Weed control.

327. HUBERT, B.

Onkruidbestrijding. (Weed control.)

Chron. Nat., 1948, 104: 306-10, bibl. 6.

A survey of recent advances in weed control. An outline of the discovery and uses of 2,4-D is given. Biological control is advocated, and the history of the control of *Opuntia*, in Australia, by the parasite, *Cactoblastis cactorum*, related in support.

328. DEPARTMENT OF COMMERCE AND AGRICULTURE, MELBOURNE.

Flame cultivation.

Bull. Fm Mech. Serv. 14, 1948, pp. 7, illus.

The theory of flame cultivation for the destruction of weeds is outlined and a brief description given of a flame cultivator, its fuel, and burner equipment. Flaming operations are described and results discussed. Control is obtained by adjusting the flame temperature and regulating the time of exposure to the flame. It is claimed, that provided the developing crop seed, tuber or bulb is covered by earth, flaming can be employed against weeds without danger to the crop. The cultivation of furrow-irrigated row crops can probably be simplified by flaming. A flame chopper for thinning row crops is illustrated, a device with revolving box-like shields which protect a proportion of the plants, leaving the rest to be thinned by flame.

329. HILLI, A.

Hormonivalmisteiden vaikutuksesta rikkaruohoihin ja hyötykasveihin. (Weed control by plant hormone products.) [English summary, p. 1.]

Maataloust. Aikakausk., 1947, 19: 22-39, bibl. 8.

The response is recorded of a large number of weeds and cultivated plants to hormone herbicides applied as sprays and dusts. Legends of the tabulated results are in English.—Standard School of Agriculture, Järvenpää, Finland.

330. HALLIDAY, D. J.

Selective weed control by chemical means.

Emp. Cotton Gr. Rev., 1948, 25: 173-9.

A short historical review of the subject is followed by notes on various herbicides, including DNOC, MCPA and DCPA or 2,4-D. A brief reference is made to

isopropyl phenylcarbamate (IPPC) which has shown some promise of selective action' roughly complementary to that of MCPA, in destroying grass species while leaving most broad-leaved plants relatively unharmed. A successful herbicide of this type would be of immense value in horticulture.

331. FOGG, G. E.

Leaf penetration of spray chemicals.

Reprinted from *Chem. Prod.*, June, 1948, 4½ pp., bibl. 7, illus.

If spraying technique is to be efficient, the relation between the complex nature of the plant epidermis and the manner of penetration of leaves by chemical substances must be considered, for the success of many horticultural and agricultural operations depends on the degree of penetration. This relation is discussed in reference to herbicides and to the action of spreaders.

332. FOGG, G. E.

The penetration of 3 : 5-dinitro-*o*-cresol into leaves.

Ann. appl. Biol., 1948, 35: 315-30, bibl. 20.

Experiments with charlock (*Sinapis arvensis* L.). Entry through the stomata is unimportant, but lethal amounts may enter through the epidermis. The selective action of 3 : 5-dinitro-*o*-cresol as a weed-killer is discussed in the light of the results obtained.—Pest Control Limited, Harston, Cambridge.

333. HENDERSON, J. H. M.

A point regarding 2,4-D penetration.

Science, 1948, 108: 483.

Regarding the suggestion by Hamner and Kiang Shi-Kien (see *H.A.*, 18: 2653) that Geon 31X latex may act by sealing in the vapours of the salt of 2,4-D, the writer states that, to his knowledge, there are no such vapours and goes on to argue that since the solutions of 2,4-D are usually extremely dilute (less than a gamma/c.c.), it would be assumed that any effect due to the vapour pressure of the salt would be ruled out. He then suggests the probable explanation lies in the fact that by decreasing the local evaporation of moisture, Geon 31X may cause better entry of 2,4-D in solution.

334. BRIAN, P. W., JAMIESON, M., AND MCGOWAN, J. C.

Toxicity of sulphydryl compounds to seeds.

Nature, 1948, 162: 780, bibl. 6.

Wheat seeds were used in testing the toxicity of sulphydryl compounds, some of which have herbicidal properties. Variations of toxicity in the group have so far not been accounted for.—I.C.I. Butterwick Res. Labs., Welwyn, Herts.

335. LACHMAN, W. H.

Some studies using isopropyl N-phenyl carbamate as a selective herbicide.

Proc. Amer. Soc. hort. Sci., 1948, 51: 541-4, bibl. 9.

This report corroborates the findings of earlier investigations that isopropyl n-phenyl carbamate [IPPC] is valuable as a selective herbicide in that it effectively kills grasses with little or no harm to broad-leaved plants. Beans, spinach, beets and set onions appeared to be especially resistant to this compound. Tributyl phosphate as a solvent for IPPC proved to be toxic to several vegetable crops. [From author's summary.]

336. HITCHCOCK, A. E., AND ZIMMERMAN, P. W.

Activation of 2,4-D by various adjuvants.

Contr. Boyce Thompson Inst., 1948, 15: 173-93, bibl. 12, illus.

Mixtures of 2,4-D and certain adjuvants (Benoclor 3C, ammonium thiocyanate, ammonium sulphamate, Hammond's Weed Killer, diallyl maleate, sodium bicarbonate, and sodium chloride) were more effective herbicides than any of the individual components used at the same concentration. Adjuvants which functioned as activators of 2,4-D included wetting agents, solubilizers, emulsifiers, penetrants, hormones other than 2,4-D, and toxicants commonly used as contact herbicides. There are many others which might well be used. Mixtures containing Tween 20 and one of the contact herbicides in combination with 2,4-D were most effective in killing the test plants. Mixtures containing lethal and sub-lethal concentrations of contact herbicides increased the activity of the hormone-like preparations with respect to the induction of hormone-curvature responses, initial injury to foliage, and killing of the entire plant. The herbicidal activity of these mixtures increased with increasing concentrations of the contact weed killer up to the point where the mixture was no more effective than the contact weed killer used alone at the same concentration as in the mixture. Relatively high concentrations of contact herbicides (1% to 30%) were required to prevent 2,4-D from inducing additive effects. Differences in the herbicidal activity of different 2,4-D formulations are probably explainable to a large extent on the basis that the adjuvants aid the penetration of 2,4-D regardless of whether it is present as an acid, ester, or salt. It is believed that more effective general-purpose herbicides than those used to date are likely to contain more than one hormone, at least one toxicant, and additional adjuvants which are effective as wetting agents, solubilizers, penetrants, emulsifiers, and stickers. [From authors' conclusions and summary.]

337. KUHNHOLTZ-LORDAT, G., AND BARRY, J. P.

De la différenciation sous l'action de l'acide 2 méthyl - 4 chlorophénoxyacétique (MCPA). (Histological de-differentiation of plants treated with 2 methyl-4 chlorophenoxyacetic acid.)

Ann. agron., Paris, 1948, 18: 470-83.

Histological changes in plants susceptible to MCPA are of two types, the response occurring either in the collenchyma or in the sclerenchyma. The observations are illustrated by photographs and histological drawings.—École nationale d'agriculture de Montpellier.

338. GREENWOOD, R. M.

Removal of hormone weedkiller residues from spray equipment.

N.Z. J. Agric., 1948, 77: 81-2, illus.

Attention is drawn to the damage that may be caused to cultivated plants (particularly tomatoes) by traces of some of the hormone weedkillers, and to the difficulty of completely eliminating such preparations from equipment that has been used for applying weedkillers before it can be used for the application of insecticides or fungicides. Details are given of methods for the removal of traces of weedkillers from such equipment.

339. McKEON, C. J.

Some impressions of agriculture in the United States of America.

J. Aust. Inst. agric. Sci., 1948, **14**: 113-18.

Includes an interesting note on weed control by oil spraying in American vineyards and citrus orchards. Diesel oil is used at the rate of 40-60 lb. per acre, applied 4 times per year. The cost of the oil is 8½ cents per gal. A one-man machine can spray 30 acres per day. It is claimed that the oil has no ill effect on the penetration of water into the soil.

340. BUSH, R.

Tar-oil weed killer [for strawberry beds].

Grower, 1948, **30**: 613.

A short note describing a method for controlling weeds in strawberry beds. Tar oil at 8% in water is applied between the rows in autumn, taking care to avoid the strawberry crowns. When the weeds die the soil is lightly turned, leaving a clean bed. With care, the method can also be used for soft-fruit bushes.

341. ALBAN, E. K., AND KEIRNS, V. E.

Pre-emergence and post-emergence weed control in vegetable crops with 2,4-D, and oil.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 526-32, bibl. 11.

A concentration of 1.32 lb. per acre of the butyl ester of 2,4-D controlled weeds for 6 weeks, but only 5 vegetable crops, viz. sweet corn, snap bean, mung bean, potato and asparagus, did not suffer. Tomato, pea, cucumber, and lima bean could stand a 0.66 lb. concentration, but this was ineffective against the weeds. One hundred gallons of oil as a pre-emergence treatment was effective against weeds in carrot, asparagus, parsnip, radish and dill, when applied in June during a period favourable for rapid weed development. Other observations are detailed.

342. WARREN, G. F., AND HERNANDEZ, T. P.

Weed control in certain crops with soil applications of 2,4-D.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 515-25, bibl. 6.

Results of satisfactory trials at Madison with the sodium salt of 2,4-dichlorophenoxyacetic acid against weeds of onions, sweet corn, asparagus and potatoes were generally satisfactory. They are here discussed at some length.

343. SWEET, R. D., AND HAVIS, J. R.

Pre- and post-emergence chemical weeding of several vegetables.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 509-14, bibl. 5.

The herbicidal values of five petroleum products, two growth regulators and a di-nitro were studied. Treatments consisted of pre-emergence sprays on the direct-seeded crops: radish, beets, and spinach, and post-setting sprays on the transplanted crops: tomatoes, cabbage, and broccoli. When weed seeds had already germinated, excellent control was obtained with several petroleum products having a boiling range below 650° F., but not with heavier fractions. Di-nitro ortho secondary butyl phenol in oil also gave good control. Under these conditions, time of application had little influence on weed kill. On the other hand, timing had a pronounced effect on the toxicity of the herbicides to the crops. Applications made immediately

after planting were more toxic to the vegetables than were those made just prior to crop emergence. Post-setting treatment showed the possibilities of eliminating hand hoeing of widely-spaced transplanted crops by the use of contact herbicides. 2,4-D and methyl ester of naphthaleneacetic acid were not satisfactory for this purpose. [From authors' summary.]—Ithaca, N.Y.

Particular crops.

344. HAMBLYN, C. J.

Sulphuric acid controls weeds in onions.

N.Z. J. Agric., 1948, **77**: 281-3, illus.

An account of spraying methods and equipment devised by Manawatu growers. The acid is used as a 10% solution, applied at the rate of about 65 gal. per acre. It is estimated that the cost of the acid and its application is from £7 to £10 per acre.

345. HEDLIN, W. A.

Chemical weed control in onions. (Preliminary paper.)

Proc. Amer. Soc. hort. Sci., 1948, **51**: 501-4.

In trials at Ithaca against *Portulaca oleracea*, *Digitaria sanguinalis*, *Amaranthus retroflexus* and *Chenopodium album*, calcium cyanamide at 75 lb. per acre pre-emergence treatment, or 50 lb. post-emergence treatment, was effective. Potassium cyanate (KOCN) proved effective at 1% in very early stages and at 2% with larger onions against very small weeds.

346. CHAPPELL, W. E.

The effect of some weed control practices on the yield and keeping quality of onions.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 497-500, bibl. 3.

Trials at Storrs, Conn., concerned sodium chloride, calcium cyanamide, sulphuric acid and various proprietary weedkillers. All substances were successful and did not affect storage. It is noted, however, that the continued use of sodium chloride in effective quantities, 20% solution at 100 gallons per acre, would result in toxic conditions in the soil.

347. CLORE, W. J.

The effect of alpha-naphthaleneacetic acid on certain varieties of lima beans.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 475-8, bibl. 4.

Alpha-naphthaleneacetic acid significantly reduced growth and yield of both pods and beans of Henderson Bush, Peerless and Fordhook 242 lima beans when applied as a spray in concentrations of 50, 100 and 1,000 p.p.m.

348. ELLIS, N. K., AND BULLARD, E. T.

Varietal response of sweet corn to 2,4-D spray, and the effect of different formulations of 2,4-D on yield.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 505-8, bibl. 3.

No formulation was found to have any effect on sweet corn growth or yield.—Lafayette, Ind.

349. DEARBORN, C. H., SWEET, R. D., AND HAVIS, J. R.

Weeding sweet corn with 2,4-D: effects of timing, rates and varieties.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 536-40, bibl. 3.

The performance of sweet corn treated at 10 different stages of growth approximately a week apart indicated that the yield was not adversely affected by 0.4, 0.6, and 0.8 of a pound of 2,4-D acid to the acre.—Ithaca, N.Y.

350. DANIELSON, L. L.

Pre-planting soil treatments with 2,4-D for weed control in spinach.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 533-5, bibl. 5.

Treatment effective. Spinach planted 4 days afterwards suffered, but not that planted 12 days later.—Norfolk, Va.

351. SMITH, C. E., COCKERHAM, K. L., AND DEEN, O. T.

Herbicidal tests on sweet potatoes and several wild host plants of the sweet potato weevil.

Bull. La agric. Exp. Stat. **430**, 1948, pp. 11.

The results obtained with several herbicides. 2,4-D was very effective in killing sweet potatoes and morning-glories and should be valuable for destroying volunteer sweet potato plants, discarded plant beds, mother rows and wild morning-glories, but it should be used with great care, since some plants, including tomatoes and ornamentals, may be severely damaged by drift from sprays and dusts applied at a distance.

352. HANCE, F. E.

Recent developments in weed control [in sugar-cane].

Science, 1948, **108**: 278-9.

A description is given of a method used in the Hawaiian Islands to supplement the herbicidal effect of 2,4-D, and at the same time reduce its injurious effect on sugar-cane. It has been found that in certain cases the amount of 2,4-D applied may be reduced to a concentration harmless to germinating sugar-cane—say 2 lb. per acre—while at the same time maintaining for 3 months or longer its full pre-emergence herbicidal effect on the field, provided that the 2,4-D is supplemented with about 5 times its weight of H.S.P.A. activator (pentachlorophenol, or sodium pentachlorophenate—U.S. Patent No. 2,370,349). It was also thought possible to discourage the downward movement of soluble 2,4-D in the soil by applying it

in oil solution. The following formula named 2,4-DAC, incorporating activator and oil was therefore devised: 66 lb. aromatic by-product petroleum oil (examples given), 10 lb. oil-soluble H.S.P.A. activator, 2½ lb. isopropyl ester of 2,4-D, 2 lb. oil-soluble emulsifying agent (not necessary if the 2,4-DAC is applied without dilution). This quantity, 80½ lb. or 10 gal., suffices for 1 acre. Diluted with 90 gal. of water containing 0.5% by weight of conditioner (alkyl aryl sulphate), it has been found particularly efficacious as a pre-emergence spray, and as a contact herbicide.

353. HANCE, F. E.

Weed control [in sugar-cane]. A liquid concentrate of the isopropyl ester of 2,4-D miscible with oil or water in any proportion.
Science, 1948, **108**: 303.

This concentrate, No. 1, is prepared by dissolving 15 lb. of a conditioning agent (e.g. an oleate of polyoxyethylene hexahydric alcohol) in 85 lb. of clear isopropyl ester of 2,4-D (=70.4% 2,4-D, cal. as acid). 8 to 10 pints of Stoddard Solvent are added to each gallon of concentrate, before diluting it with water, to inhibit the settling of heavy oil globules. Field observations indicate that 1½ pints of the concentrate diluted to 25 gal. with diesel oil, when applied to 1 acre of land under recently-planted sugar-cane, will arrest the germination and growth of weed and grass seed and seedlings for 7 weeks without ill effects on the sugar-cane cuttings below. The same concentrate diluted with diesel oil at 2.4% equivalent of 2,4-D acid, showed promise in controlling the growth of woody weeds, such as guava, lantana, Java plum, etc. The concentrate has one notable disadvantage: it employs the isopropyl ester of 2,4-D so that, even when diluted to 160 times its volume with diesel oil, the vapour drift of the ester may carry it to sensitive vegetation and damage it.—H.S.P.A. Exp. Stat., Honolulu.

Noted.

354.

a HAVIS, J. R.

The herbicidal properties of certain pure petroleum hydrocarbons (preliminary report).
Proc. Amer. Soc. hort. Sci., 1948, **51**: 545-6, bibl. 2.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

General.

355. SQUIBBS, F. L.

Reports of Seed Production Officer for 1946 and 1947.

A.Rs. Dep. Agric., Cyprus, 1946 and 1947, Appendix VII, pp. 8 and 10, duplicated.

Mainly concerned with seed production for export of cauliflower and broccoli, and, to a lesser extent, of lettuce, carrots, cucumber and onion.

356. SHAM SINGH.

Seed production and improvement of winter [temperate] vegetables.

Indian Fmg., 1946, **7**: 463-7, bibl. 7 [received 1948].

An article for the guidance of prospective producers of European vegetable seed in India, based on methods used elsewhere.

357. ÅKERMAN, A.

Det skånska jordbruket och dess anpassning till tidsläget. (Agriculture in the Swedish province of Scania today.) [English summary ½ p.]

J. roy. Swedish Acad. Agric., 1948, **87**: 239-52.

Deals also with vegetable, potato and fruit growing in the agriculturally productive province of Scania.

358. WEIHENSTEPHAN.

Aus dem Institut für Gemüse- und Zierpflanzen der Lehr- und Forschungsanstalt für Gartenbau in Weißenstephan. (Report of the institute for vegetable growing and ornamental plants at the horticultural college and research station Weißenstephan.)

Gartenbau-Forschung, 1947, **H.1**, pp. 9-43.

A. **Vegetable growing.** Includes notes on certain

vegetables, such as Chinese cabbage, artichoke, cardoon (*Cynara cardunculus*), celery, fennel, zucchini (a kind of Tripoli squash), egg plant, red pepper, sweet corn, the cultivation of which—as a result of trials—is recommended on a limited scale in Bavaria. Tomatoes: An alternative to stopping the plants is the removal of all flower trusses arising above the last truss wanted. This makes for more foliage. Artificial pollination by shaking of the plants at flowering led to increased fruit set and yields. Lettuce: Terracotta and undamaged cardboard pots were best for raising plants. The effect of spacing on yield and head development is tabulated. B. In the section devoted to ornamental plants, an account is given of trials with a number of pot plant and cut flower varieties.

359. KOPETZ, L. M.

Der Einfluss der Saatstärke auf die Ertragsbildung. (The effect on yield of density of sowing.)

Jb. Hochsch. Bodenk. Wien, 1947, Bd. 1, 1948, 2. (wiss.) Teil, pp. 83-94, bibl. 6.

The review includes a report of the author's own unpublished experiments with vegetables. Unthinned onions and carrots yielded 132% and 170% respectively of the thinned plots, yield per area rather than yield per plant determining the result. This means that an increase in yield is brought about by a saving in labour. With beans and peas the amount sown should be raised from 100 kg. and 140-160 kg. respectively, as generally advocated, to 200-220 kg. per hectare.

360. RENARD, W.

Gemüsebau mit getopften Pflanzen. (The use of potted plants in vegetable growing.)

Ceres, Hamburg, 1948, 1: 9: 5-8.

This is an illustrated description of implements for the manufacture, on the spot, of pots from compost and other material in which to transplant vegetable plants to the field. An interesting development is the pricking-out machine which forms the pot around the seedling root. A photograph shows the difference in seedling growth in two shapes of pot.

361. ANON.

A dibber on wheels.

Qd agric. J., 1948, 67: 57.

An illustrated description of a home-made, labour-saving device consisting of a heavy wooden wheel, 2 ft. in diameter and 3 in. thick, with hardwood pegs, or dibbers, about 6 in. apart, mounted around its perimeter. The wheel is mounted on shafts, like a wheelbarrow, above which is a tank from which a hose leads water to the holes made by the machine as it is pushed along. A 2-wheeled machine was also made. Both machines were used successfully for transplanting celery, onions, lettuce, cabbage, etc.

362. HALIDAY, D. J.

A guide to the uptake of plant nutrients by farm crops.

Bull. Jealott's Hill Res. Stat. 7, 1948, pp. 34, bibl. 97.

A condensed and simplified summary of the present state of knowledge concerning the chemical composition of farm crops at various stages of growth. The hope is expressed that the bulletin will help farmers to assess their fertilizer requirements by giving some indication

of the quantities of nitrogen and other mineral resources that are lost to the soil in cropping the land. The question of the response to different levels of manuring is not discussed. The following crops are dealt with amongst others: brussels sprouts, cabbage, turnips, potatoes, tomatoes, peas, beans, and carrots. A useful table shows the average composition of various crops at harvest.

363. GILBERT, C. S., AND OTHERS.

Nitrate accumulation in cultivated plants and weeds.

Bull. Wyo. agric. Exp. Stat. 277, 1946, pp. 37, bibl. 29, illus. [received 1948].

Many plants, including vegetables, growing in Wyoming contain under certain circumstances considerable quantities of potassium nitrate, thus beet from Carlile contained 2.8% KNO₃ on air-dry basis, equivalent to 2 g. of nitrate per lb. of fresh beet. The conditions which induce storage of KNO₃ are not fully known, but the nitrogen and phosphorus content of the soil and the amount of light reaching the plant exert an influence. The amount stored may vary greatly from one species to another and from one season to the next.

364. BRASHER, E. P.

The effect of minor elements and widely varying fertility levels on the yields of nine vegetable crops.

Proc. Amer. Soc. hort. Sci., 1948, 51: 346-8.

One year's observations are recorded for tomato, potato, sweet corn, broccoli, cabbage, sweet potato, water- and musk-melons and squash on the coastal plain soils of Delaware.

365. ROOTSI, N.

Die Feststellung des spezifischen Gewichtes bei Gemüse und Obst. (The determination of the specific gravity of vegetables and fruit.) *Gartenbau-Forschung*, 1947, H.1, pp. 77-104.

The importance of specific gravity determinations of vegetables and fruit is emphasized, especially as a means of quality evaluation in breeding and selection work. Specific gravity values of a number of vegetable and fruit varieties at various stages of maturity, etc., are tabulated in detail for produce harvested in 1944 and 1945. The significance of the figures is discussed. —Horticultural college and research station, Weihenstephan.

366. BURCHFIELD, H. P., AND MCNEW, G. L.

The colorimetric determination of 2,3-dichloro-1,4-naphthoquinone on seed.

Phytopathology, 1948, 38: 665-9, bibl. 8.

A simple, rapid method of analysing seed for dosage of 2,3-dichloro-1,4-naphthoquinone is described. This chemical has been used for the treatment of spinach and beet seed, and is promising as a seed protectant of other crops, including pepper and tomato.

367. HEUBERGER, J. W.

Yield response of vegetable plants sprayed with dithiocarbamate fungicides.

Abstr. in Phytopathology, 1948, 38: 576.

Data obtained show that tomatoes, potatoes, cantaloupes, and cucumbers (for pickles) sprayed with zinc dithiocarbamate fungicides have produced higher yields than when sprayed with copper fungicides.

368. WALLACE, G. B.
Bacterial soft rot of vegetables.
E. Afr. agric. J., 1948, **14**: 34-5, bibl. 4, illus.
 The symptoms of the rot caused by *Bacterium carotovorum* are described and control measures recommended.
369. MOORE, W. D.
Weather and the incidence of *Sclerotinia sclerotiorum* on vegetables in South Florida from 1944 to 1948.
Plant Dis. Rptr., 1948, **32**: 380-2, bibl. 1.
 Summer rains, flooding, types of summer ploughing, and chemical soil treatments are influential factors in the survival of viable sclerotia. Weather influences, at present, must be accepted in terms of trends, rather than definite, measurable relationships.
370. KERLING, L. C. P.
***Pythium debaryanum* and related species in South Australia.**
Trans. roy. Soc. S. Aust., 1947, **71**: 253-8, bibl. 14, being Reprint Waite agric. Res. Inst. Adelaide No. 520.
 A study of *Pythium* spp. from pea seedlings, potato affected with "leak" and a tomato seedling.
371. BAKER, W. A., AND BRADLEY, W. G.
The European corn borer: its present status and methods of control.
Fmrs' Bull. U.S. Dep. Agric. **1548**, 1948, pp. 46.
 The favourite host of corn borer (*Pyrausta nubilalis* Hbn.) is maize, but where two generations predominate it also attacks vegetables, field crops, flowers and weeds. Its habits and practical protective measures are described.
- Garden vegetables.**
- (See also 24-31, 72, 210, 249, 265, 267, 312, 691, 700, 705, 708, 717, 718.)
372. WATSON, R. D.
Aster yellows in carrots in Idaho.
Plant Dis. Repr., 1948, **32**: 237.
 The aster yellows virus caused serious disease in carrots grown for seed in Idaho during 1943 to 1945, 30% to 50% of the plants being infected, but later its intensity declined.
373. WATSON, R. D.
Carrot bacterial blight control in Idaho.
Plant Dis. Repr., 1948, **32**: 238-9.
 Trials showed that carrot bacterial blight (*Xanthomonas carotae*) can be controlled by using hot water-treated seed.
374. GLENDENNING, R., AND FULTON, H. G.
Experiments in control of the carrot rust fly (*Psila rosae* L.).
Sci. Agric., 1948, **28**: 545-53, illus.
 Experiments on the control of carrot fly at Chilliwack and Sardis, British Columbia, in 1946 and 1947, are described. They were designed to show the number of treatments required, and the best method of applying benzene hexachloride. This was applied as a 20% 666 dust with $\frac{1}{2}$ % gamma isomer content. The treatments included incorporation in the soil before sowing, and dusting the foliage with 1, 2, or 3 applications at 10-day intervals. Treatments with naphthalene, mothballs, and stove oil were included for comparison. A very high degree of control over the first two generations of fly was obtained from one application of benzene hexachloride. Control of the third generation by September applications was less satisfactory. No taint remained in the carrots receiving foliage treatment, but tainting and direct injury to the roots occurred as a result of soil incorporation of 666. Benzene hexachloride gave considerably better control than any other material tried, and is cheap and simple to apply.
375. SWYNNERTON, R. J. M.
Further note on onion experiments on Kilimanjaro.
E. Afr. agric. J., 1948, **14**: 23-5, bibl. 1.
 On flat Chagga beds, with the Bombay Red variety of onion, a close spacing in rows $4\frac{1}{2}$ in. apart has persistently been found to be very much superior to wider spacings. Low rates of application of sulphate of ammonia such as 1 to 2 cwt. per acre may usually be expected to give substantial and economic increases in yields of onions, provided applications, are made within 30 days of transplanting. If $4\frac{1}{2}$ in. spacing is used, higher rates of application of sulphate of ammonia are likely to be economic and the time of application is less important. Under 1947 conditions and in the soils of Kilimanjaro, silicophosphate effected no increase in the yield of onions over untreated plots. [See also *H.A.*, 17: 1750.]
376. MACGILLIVRAY, J. H.
Effect of irrigation on the yield of onion seed.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 423-7, bibl. 3.
 In trials at Davis irrigation resulted in increased yield of seed without material effect on percentage germination or size of seed.
377. HATFIELD, W. C., WALKER, J. C., AND OWEN, J. H.
Antibiotic substances in onion in relation to disease resistance.
J. agric. Res., 1948, **77**: 115-35, bibl. 21.
 Varieties of onions of different types (of colour and pungency) were tested in the field for resistance to smudge (*Colletotrichum circinans*), neck rot (*Botrytis allii*), and black mould (*Aspergillus niger*). When each of these three organisms gains access to the fleshy scales there is no correlation between colour and resistance but they show different degrees of pathogenicity. *A. niger* is very mildly pathogenic, *C. circinans* rather more aggressive and *B. allii* an aggressive, fairly rapid rot producer, and they show a descending scale of sensitivity to the non-volatile antibiotics in the fleshy scales in that order. The order of the first two was reversed with regard to volatile antibiotics, but *B. allii* was again least sensitive. The results suggest that the antibiotics in the fleshy scales influence the relative resistance of the tissue to the three organisms.
378. TIMS, E. C.
Spraying and dusting for control of onion mildew in Louisiana.
 Abstr. in *Phytopathology*, 1948, **38**: 572.

None of the materials tested gave any effective control of mildew on bulb onions, but in one test bordeaux mixture reduced the amount of mildew in seed onions. Copper dust also showed some promise on seed onions in tests in 1947.

379. HALLEMANS, A.

La lutte contre la teigne du poireau (*Acrolepiassectella*) au moyen de produits à base de D.D.T. (The control of the leek moth by DDT preparations.)

Courr. hort., 1948, 10: 540, illus.

To control the leek moth DDT can be applied as a dust, or as a spray with an emulsion containing 25% DDT applied at the rate of 250 to 300 g. per 100 litres of water.

380. SMITH, F. F., AND BRIERLEY, P.

Aster yellows in shallot and gladiolus.

Phytopathology, 1948, 38: 581-3.

Aster yellows has been transmitted from chrysanthemum to shallot, and the disease has been observed on gladiolus, killing the tops.

381. TAYLOR, G. G.

Experiments for control of white-butterfly (*Pieris rapae* L.) and diamond-back moth (*Plutella maculipennis* Curt.) on cabbages. *N.Z. J. Sci. Tech.*, 1948, 29, Sec. A, pp. 265-72.

The results obtained indicate that economic control of white-butterfly and diamond-back moth can be obtained with DDT as a 1% to 2% dust or as an 0.1% spray at intervals of 14 days or more.

382. DE WILDE, J.

De koolvlieg en zijn bestrijding. (The cabbage fly and its control.)

Meded. Tuinbouwvoorlichtingsdienst 45, 1947, pp. 70, illus.

Cabbage and radish growing in Holland is prejudiced by severe infections of the cabbage fly, *Chortophila brassicae* Bché. The damage is greatest in early cabbages in May and the first half of June, and losses of 11% to 82% have been reported. The life history of the fly is described in detail and control measures are described. A table shows the preparations that may be used for its control, with concentration, amounts and time of treatment.

383. TERRY, H. B.

Cauliflower and broccoli [in South Africa].

Fmg S. Afr., 1948, 23: 665-7, illus.

A short practical article of instruction for growing these crops under South African conditions. Cauliflower varieties grown include: Snowball, Early London, Gilt Edge, Reliance, November Heading, Southern Cross and Late Metropole.—Div. of Hort., Pretoria.

384. WILSON, R. D., AND WARING, E. J.

Some observations and experiments concerning the role of molybdenum in the nutrition of the flowering plant.

J. Aust. Inst. agric. Sci., 1948, 14: 141-5, bibl. 13, illus.

An interveinal chlorosis of cauliflower leaves thought to be an early stage of the whiptail disease, is described. Treatment in the field of chlorotic plants with sodium

or ammonium molybdate at rates of 0.025 to 0.2 grams per plant resulted in the disappearance of the oxidizing materials (as determined by the diphenylamine-sulphuric acid test) from the interveinal areas within 2½ to 5 days in the case of the younger chlorotic leaves and the formation of a healthy dark green colour. It would appear that molybdenum acts as a catalyst in the reduction processes of the cauliflower plant, probably in the reduction of nitrates. [From authors' summary.]

385. CAREW, J., AND THOMPSON, H. C.

A study of certain factors affecting "buttoning" of cauliflower.

Proc. Amer. Soc. hort. Sci., 1948, 51: 406-14, bibl. 8.

In trials at Ithaca, N.Y., the exposure of plants to low or below freezing temperatures did not alone induce buttoning. Holding young plants in flats beyond their best transplanting condition increased a tendency to bolt. Retarding the development of older plants in flats by exposure to low temperature or by withholding soil moisture resulted in decreased buttoning and later of increased number of marketable heads. Low soil nitrogen increased the incidence of buttoning. The practical significance of these findings is discussed.

386. SEVERIN, H. H. P., AND TOMPKINS, C. M.

Aphid transmission of cauliflower-mosaic virus.

Hilgardia, 1948, 18: 389-404, bibl. 14, illus.

Eleven species of aphid that do not multiply on cauliflower plants in nature were shown to be vectors of the cauliflower-mosaic virus, five of them being more efficient vectors than three aphid species that do breed on cauliflowers. None of twenty-one varieties of cauliflower experimentally infected with the virus by aphids was resistant to the disease.

387. MINISTRY OF AGRICULTURE, LONDON.

Outdoor salad crops.

Bull. Minist. Agric., Lond., 55, 4th edition,* 1948, pp. 42, illus.

The fourth edition of the bulletin has been completely re-written. The grower has here a reliable source of information on salad crops that incorporates latest developments, such as the addition of potassium nitrate to the irrigation water in lettuce cultivation, (1) for fertilizing purposes (1 : 10,000-1 : 20,000) and (2) to help the plants "to grow away from infestations of aphids" (1 : 30,000). Lettuce again receives the most detailed attention (pp. 1-12), while celery takes second place in fullness of treatment (pp. 20-28). Other crops dealt with are endive, chicory, radish, salad or spring onions, corn salad, ridge cucumbers, tomatoes, watercress, carrots, beetroot and celeriac. Pests and diseases, marketing and rotation are among the subjects discussed in addition to the requirements of the crop itself.

388. CHESTERS, C. G. C., AND STREET, H. E.

Studies in plant nutrition. I. The effect of some organic supplements on the growth of lettuce in sand culture.

Ann. appl. Biol., 1948, 35: 443-59, bibl. 109, illus.

The addition of an aqueous extract of leaf mould in

* For 3rd edition see *H.A.*, 12: 901.

sand cultures of lettuce (May King Improved) induced enhanced growth and a higher shoot/root ratio, and the plants had a slightly higher moisture content. The addition of either yeast extract or hydrolyzed casein did not result in any significant difference in growth as compared with plants receiving only inorganic nutrients. The role of organic materials in the nutrition of higher green plants is discussed in relation to these results.

389. FRANKLIN, D. F.

Using hormone sprays to facilitate bolting and seed production of hard-headed lettuce varieties.

Proc. Amer. Soc. hort. Sci., 1948, 51: 453-6.

Trials at the Parma Branch Station, Idaho, indicate that the application of the ammonium salt of 2,4-dichlorophenoxyacetic acid or possibly other growth substance at the large rosette stage with unfolding of the leaves just starting may eliminate the expensive necessity for slashing or breaking open hard-headed lettuce varieties to release the seed stalk. Considerably more work on the subject is, however, still needed before such a practice can be recommended.

390. ALLEN, M. W.

Relation of soil fumigation, nematodes, and inoculation technique to big vein disease of lettuce.

Phytopathology, 1948, 38: 612-27, bibl. 19.

Negative results were obtained in experiments on nematode transmission of big vein virus with twelve species of nematodes tested. Evidence was obtained indicating that infection of lettuce with the virus occurs only through the roots.

391. TAYLOR, C. A.

Some factors affecting germination of celery seed.

Plant Physiol., 1949, 24: 93-102, bibl. 9, illus.

If the pre-emergence period of celery seed could be shortened, it would simplify the culture considerably. This is a very comprehensive investigation into the factors affecting the germination of celery seed and the emergence of pre-germinated seed. NaOCl treatment is a valuable part of the pre-sprouting process, as it hastens germination and controls moulds that are liable to attack confined, moist seeds. Light also hastens germination, but is not recommended, for, where seeds are treated in masses, the results are not uniform. Alternating temperature is found to be better than a constant one. Other factors investigated are aeration, water content of seed, and irrigation methods after sowing. A satisfactory method of pre-sprouting seeds prior to sowing out of doors is described.—Bureau of Plant Industry, Salinas, California.

392. PURDUE, C. E.

Celery from the Murrumbidgee Irrigation Area marketed in Sydney. Need for efficient methods of handling.

Agric. Gaz. N.S.W., 1948, 59: 355-6.

Celery can be successfully marketed in Sydney from the Murrumbidgee Irrigation Area, if handling of the crop during marketing is efficient and speedy. When pre-cooled at a temperature of about 50° F. overnight

it was crisp and fresh the next morning. The consignment arrived in good condition and was of the highest quality.

393. ATKINSON, J. D.

Cracked-stem of celery (*Apium graveolens* L.).

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 261-4, bibl. 5, illus.

Stem cracking of celery in New Zealand is rather like that reported from Florida, but the leaf and root symptoms are different. In field trials dressings of borax reduced incidence from 87% to 1%.

394. ALBAN, E. K., AND KEIRNS, V. E.

The effect of rotenone, commercial, and aerosol grade DDT dusts on the total yield, grade, and maturity of seven cucurbit varieties.

Proc. Amer. Soc. hort. Sci., 1948, 51: 448-52, bibl. 1.

Most varieties of cucurbit were damaged by commercial but not by aerosol grade of DDT. The aerosol grade of DDT compared favourably with rotenone.

395. LAL, G., AND JAIN, N. L.

Preservation of water melon juice.

Indian Fmg., 1948, 9: 67-9, bibl. 3.

A short report on investigations into the possibility of using the water-melon for making beverages. It can be preserved satisfactorily as a squash of 45° Brix sugar concentration and 1% acidity. The method of preparing this squash is given.

396. LEONTJEV, I. F.

The chemistry of the oil from water-melon seed. [Russian.]

Priroda (Nature), 1948, No. 5, p. 37, bibl. 7.

A short review of work carried out in Russia and more recently by D. Dhingru and P. Narain in India (*J. Indian chem. Soc.*, 1945, 22: 123).

397. PARRIS, G. K.

Further observations on the inheritance of resistance to *Fusarium* wilt in watermelon.

Plant Dis. Repr., 1948, 32: 378-9, bibl. 6.

Results obtained confirm that the F₁ from the cross of wilt-resistant water-melon × wilt-susceptible water-melon are not always susceptible to wilt. The percentage survival of hybrid water-melon plants when grown on wilt-infested land in Florida is tabulated.

398. LINNASALMI, A.

On the control of cucumber scab (*Cladosporium cucumerinum* Ell. and Arth.).

Maataloust. Aikakousk., 1947, 19: 124-7.

None of the 9 fungicides tested gave appreciable control of *Cladosporium cucumerinum*, the most widespread and harmful fungus disease of cucumber field cultures in Finland.—Agricultural Experiment Station, Tikkurila, Finland.

399. ISHAQ, M., AND CHUGHTAI, I. D.

Utilization of tomatoes for juice and seed extraction.

Indian J. agric. Sci., 1946, 16: 512-19, bibl. 7 [received 1948].

A method is described for extracting juice for canners and seed for growers at the same time. It is claimed

that the method is of great economic importance to vegetable seed growers and tomato juice manufacturers.—Fruit Products Res. Lab., Quetta.

400. CULPEPPER, C. W., AND OTHERS.
Dehydration of tomatoes.

Fruit Prod. J., 1948, **28**: 45-53, 56, 77-81, 93, bibl. 27.

The purpose of this investigation, extending over 2 years, was to obtain information on the range of quality of the dried product obtainable from a number (24) of the more important tomato varieties. Results are discussed with reference to variety.—Bur. Plant Industry Stat., Beltsville, Md.

401. SAYRE, C. B.

Early and total yields of tomatoes as affected by time of seeding, topping the plants, and space in the flats.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 367-70, bibl. 1.

Trials at Geneva, N. York, indicate that there is no advantage in too early sowing, that topping will result in increased yield if transplanting is unduly delayed, and that spacing in the flats may affect yield.

402. WARK, D. C., AND GILES, J. E.

Some studies in the growth of tomato plants and comparison of tomato varieties grown under irrigation.

J. Coun. sci. industr. Res. Aust., 1948, **21**: 99-115, bibl. 4.

The studies were carried out in the Murray Valley, the Murrumbidgee Irrigation Area, and the Northern Territory with 36 varieties. The performance of each is recorded. No one variety had all the qualities favoured by growers and consumers, but parent material is available for the production by plant breeding of a variety of good bush type, producing a high yield of good quality, medium-sized fruit when grown unstaked and watered by furrow irrigation. Until better varieties are available, Pearson 29-17 appears to be one of the most desirable under the conditions stated. It is a bush type suitable for canning or the fresh market and mid-season to late in maturing.

403. HEMPHILL, D. D., AND MURNEEK, A. E.

A preliminary study of the effect of axillary foliage on yield of tomatoes.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 359-61.

Trials at Columbia, Mo., show that the foliage of decapitated axillary shoots augments the yield of tomatoes. The axillary shoot just below the cluster appears to account for most of the increase.

404. LACHMAN, W. H.

Some effects of blossom removal on vegetative development and defoliation in determinate tomato plants.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 341-5, bibl. 6.

An acute form of defoliation is very prevalent in early determinate tomato varieties, those varieties which set fewest fruits on each cluster of blossoms being least susceptible.

405. WILSON, C. C., AND KRAMER, P. J.

Relation between root respiration and absorption.

Plant Physiol., 1949, **24**: 55-9, bibl. 8.

The authors found no relationship between the oxygen absorption and the water intake of the tomato variety Marglobe. It seems probable that the energy released by respiration plays no significant role in the intake of water through the roots of freely transpiring plants.—University of Georgia.

406. WOKES, F., AND OTHERS.

Vitamin C in English tomatoes.

J. Soc. chem. Ind. Lond., 1948, **67**: 262-4, bibl. 7.

Variation in the vitamin-C content of different tomatoes has been found much wider than can be explained by previously investigated factors, such as organic manuring, fertilizer treatment, weight of fruit, polyploidy or varietal differences. Experiments on five varieties given different fertilizer treatment during outdoor cultivation at Maidstone in 1946 showed certain effects, especially with calcium, but the main conclusion reached was the importance of climatic factors. [Authors' summary.]

407. WITTWER, S. H., STALLWORTH, H., AND HOWELL, M. J.

The value of a "hormone" spray for overcoming delayed fruit set and increasing yields of outdoor tomatoes.

Proc. Amer. Soc. hort. Sci., 1948, **51**: 371-80, bibl. 15.

Water sprays of para-chlorophenoxyacetic acid, 25 p.p.m., applied to the first flower clusters of Victor and Rutgers tomatoes growing in the open in Michigan resulted in significantly more and larger early fruit. The increase would appear to be related to the fact that prevailing night temperatures in the district during the fruit setting period are less than 59° F.

408. LUCKWILL, L. C.

A method for the quantitative estimation of growth substances based on the response of tomato ovaries to known amounts of 2-naphthoxyacetic acid.

J. hort. Sci., 1948, **24**: 19-31, bibl. 7.

The essential features of the method described are: (1) treatment of unpollinated tomato ovaries with known amounts of growth substance in aqueous solution, and (2) measurement of the increase in growth rate of the treated ovaries over that of the controls, during a period of six days. The increase in the growth rate of the ovary is related to the dose of growth substance administered, but does not depend directly on the concentration of the solution used. The relationship between the response of the ovary and the logarithm of the dose can be represented by a normal sigmoid curve. For any given growth substance the slope of the dosage/response curve is constant, but its position on the abscissa, as measured by the median effective dose (ED 50), varies from experiment to experiment. Over a series of eight experiments with 2-naphthoxyacetic acid the ED 50 showed a strong negative correlation ($r = -0.971$) with the maximum growth rate, varying from 0.458 μg . per ovary in November to 0.185 μg . in May when

conditions for growth were optimum. Examples are given showing how these data can be used for estimating the relative fructigenic activity of different growth substances, and for measuring the natural hormone content of apple seed extracts. [Author's summary.]—Long Ashton Res. Stat., Bristol.

409. NICHOLAS, D. J. D.

Experiments on correcting magnesium deficiency in glasshouse tomatoes.

J. hort. Sci., 1948, 24: 1-18, bibl. 14.

Magnesium deficiency in tomato has been widespread in recent years in glasshouse holdings in England and reductions in yield have been reported at many centres. Experiments were therefore laid down to test corrective measures. This paper describes these experiments and summarizes the main results. The trials established the superiority of the foliage spray method (a 2% spray applied 5 times at 2-3 week intervals) over soil application of magnesium sulphate, both as regards efficiency and economy of material, of which about 5 cwt. per acre was used in the spray. The trials also showed that magnesium sulphate incorporated in a fungicidal spray (Shirlan A.G.) is as effective as when used alone.—Long Ashton Res. Stat., Bristol.

410. JACKS, H.

A survey of tomato diseases under glass.

N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp. 164-9.

The chief diseases and pests of glasshouse tomato plants in New Zealand are tobacco mosaic, leaf mould, verticillium wilt and eelworm. Tomato-streak, late blight, botrytis and white-fly are prevalent whilst tomato-spotted wilt, bacterial canker and tomato mite are of minor importance, with cucumber mosaic, fusarium wilt, sclerotinia, aphids and millipedes in isolated cases only.

411. DAVIS, B. H.

Blossom-end rot of tomatoes.

Circ. N.J. agric. Exp. Stat. 512, 1948, pp. 2.

This is not a parasitic disease and spraying the plants in dry weather may increase the rot. The plants should be kept growing steadily by maintaining sufficient soil moisture, for which irrigation and humus are recommended. During dry weather cultivation should be only deep enough to fill in cracks and destroy weeds. In wet weather cultivation should be such as to allow water to evaporate freely and to supply more air to the roots.

412. PLOPER, J.

La peste negra del tomate y la peste blanca del pimiento. (The black disease of tomato and the white disease of pimiento.)

Rev. mens. B.A.P., 1948, 31: 369: 73, 75.

Two serious plant diseases in Tucuman province, Argentine, are described. The tomato "peste negra" is a virus disease transmitted by the thrips *Frankliniella paucispinosa* Moul. Affected plants are smaller than normal, dark brown in the upper one-third with the terminal shoots curved to one side. Control measures are directed towards the vector, spraying with DDT being recommended. The "peste blanca" of pimiento, *Capsicum [annuum]*, is also assumed to be a virus disease, but the vector has not been determined. In this disease the leaves are curled and somewhat crinkled, and have pale interveinal blotches. Control

measures recommended are the same as those for tomato "peste negra".

413. DAVIS, B. H.

Bacterial canker of tomato.

Circ. N.J. agric. Exp. Stat. 511, 1948, pp. 2.

The symptoms and cause [*Corynebacterium michiganense*] are briefly described. The best way to control this disease is to plant disease-free or certified seed in clean soil.

414. KENDRICK, J. B., JR., AND WALKER, J. C.

Predisposition of tomato to bacterial canker.

J. agric. Res., 1948, 77: 169-86, bibl. 7.

Tomato (Bonny Best) plants were exposed to various environments for a 30-day period and then inoculated with the canker organism, *Corynebacterium michiganense*. At a soil temperature of 24° C. and an air temperature of 20° C. plants succumbed to the disease less rapidly than those exposed at higher or lower soil temperatures. In plants at an air temperature of 24° C. and a soil temperature slightly lower the disease progressed less rapidly than in plants at higher or lower air temperatures. At optimum soil moisture plants succumbed more rapidly than at higher or lower soil moistures. With low light intensity the disease developed more rapidly than with higher light intensity.

415. FELIX, E. L.

Buckeye rot-resistant tomatoes.

Abstr. in *Phytopathology*, 1948, 38: 569.

The fruit of eleven tomato varieties (named) proved to be highly resistant to buckeye rot caused by *Phytophthora parasitica-terrestris* in natural and artificial inoculations at the Tennessee Agricultural Experiment Station. The resistant fruits differ in size, shape, colour and thickness of skin.

416. STODDARD, E. M., AND DIMOND, A. E.

Influence of nutritional level on the susceptibility of tomatoes to fusarium wilt.

Phytopathology, 1948, 38: 670-1, illus.

The nutrient solution used was that of Walker and Foster [*H.A.*, 16: 2124] but as the solutions in the present tests were not the sole source of water the levels of nutrition are less than those of Walker and Foster and are here specified as 0.1x, 1x and 10x, respectively. The plants (var. John Baer) were inoculated with *Fusarium lycopersici* and the severity of infection is shown by tabulated data and by photographs. There was severe infection at x nutritional level, less at 0.1x and very little at 10x.

417. DAVIS, B. H.

Tomato anthracnose.

Circ. N.J. agric. Exp. Stat. 510, 1948, pp. 2.

The symptoms, cause [*Colletotrichum phomoides*] and control of tomato anthracnose are described. Control measures include crop rotation, keeping the plants vigorous, spraying and dusting (suitable preparations and time of applications are mentioned).

418. NELSON ESTRADA, R., AND FERNANDO VILLAMIL, G.

Experimento de campo sobre el control de nematodos a base de D-D. (A field experiment for the control of eelworms by D-D preparations.)

Notas agron., Palmira, 1948, 1: 1-5, bibl. 5.

The tomato New Pritchard was used in a 4×4 latin

square experiment to test the effect of D-D against the nematode *Heterodera marioni*, the rates of application being A=300 lb., B=200 lb. and C=100 lb. per acre. Significant difference was found between treatments A and C but not for A and B, based on kilograms of fruit produced, but no significant differences were noted in number of plants affected by eelworm.

419. MORGAN, W. L.

Control of tomato pests.

Agric. Gaz. N.S.W., 1948, 59: 421-2.

DDT preparations are replacing the older insecticides, lead arsenate and nicotine sulphate, in pest control measures for tomatoes, but sulphur sprays or dusts are still necessary for tomato mite control, and paris green is useful for preparing poison bran baits for cutworms. A general purpose dust mixture commonly used contains 40% sulphur, 8% copper oxochloride or copper carbonate, and 1% DDT. A general purpose spray in general use in coastal tomato growing districts consists of DDT emulsion (20%) 16 fluid oz. : colloidal sulphur 1 lb. : bordeaux mixture (1 : 1 : 40 or 1 : 1 : 20) 40 gal. Tomatoes in all districts should receive regular treatment with sprays or dust containing sulphur to control tomato mite.

420. CHAMBERLAIN, E. E.

Virus diseases of the tree tomato (*Cyphomandra betacea* Sendt.). 1. Cucumber-mosaic (*Cucumis virus 1* of Smith, 1937).

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 256-60, bibl. 3, illus.

Several virus diseases have appeared on tree tomatoes in New Zealand. One is caused by cucumber-mosaic virus which is widely distributed on other hosts throughout the country. It is found on tree tomatoes wherever they are extensively grown. The symptoms are mottled, narrow leaves, reduced amount of foliage, and dark blemishes on ripe fruit. The disease is transmitted by aphids but is not carried in the seed of tree tomatoes.

421. ODLAND, M. L., AND NOLL, C. J.

Hybrid vigor and combining ability in eggplants.

Proc. Amer. Soc. hort. Sci., 1948, 51: 417-22, bibl. 2.

Trials at State College, Pa, indicate that the technique of procuring hybrid eggplant seed is not difficult, vigorous, large, early-set plants being, however, a pre-requisite. Generally the best results are got from the first bud formed in each cluster.

422. DECKER, P.

Breeding of eggplants for resistance to *Phomopsis* blight.

Abstr. in *Phytopathology*, 1948, 38: 569.

Crosses of two resistant strains of eggplant, Pegan and Bengan, from India with commercial varieties produced disease-resistant hybrids without spines and with purple fruits.

423. PADMANABHAN, S. Y.

A new seedling disease of brinjals.

Ind. J. agric. Sci., 1947, 17: 393-5, bibl. 7, illus.

The fungus associated with the symptoms of the eggplant disease described is a species of *Ascochyta*, for which the name of *A. melongenae* n.sp. is proposed.

424. ODLAND, M. L.

Eggplant hybrids produce high yields of uniform fruit.

Suppl. 1 to Bull. 502, 61st A.R. Pa agric.

Exp. Stat., 1948, p. 11, illus.

Hybrid vigor is sufficiently pronounced in the eggplant to provide a means of markedly increasing yields. Details are given of 1947 yields from 7 parents and of F₁ hybrids from them. One of the latter, New Hampshire Hybrid x Florida High Bush, yielded at the rate of 37 tons per acre. In general, the average size of fruits was not greatly changed, but the total average number of fruits per plant increased markedly.

425. AKAMINE, E. K.

Effect of 2,4-dichlorophenoxyacetic acid on root development in bean cotyledons

Science, 1948, 108: 209.

Accounts are given of experiments in which bean cotyledons, from which the germ ends had been excised, developed roots after treatment with 2,4-D.—Hawaii Agric. Exp. Stat.

426. VAN WEZER, A.

Culture tardive des haricots sous verre. (Late season cultivation of French beans under glass.)

Courr. hort., 1948, 10: 413-14.

The author recommends growing French beans (particularly dwarf varieties) after tomatoes under glass. Instructions are given suitable for houses free from tomatoes from July onwards.

427. HARDENBURG, E. V., AND ETO, W. H.

The role of snakehead plants in beans.

Proc. Amer. Soc. hort. Sci., 1948, 51: 486-92, bibl. 11.

"Baldhead" or "snakehead" in bean may be due to injury in threshing, or to the action of insects, bacteria or fungi. Trials at Ithaca, N.Y., indicate that only snakehead which involves the loss of both primary leaves will cause a significant reduction in yield.

428. YU, T. F., AND FANG, C. T.

Fusarium diseases of broad beans. III. Root-rot and wilt of broad beans caused by two new forms of *Fusarium*.

Phytopathology, 1948, 38: 587-94, bibl. 9.

Root-rot is caused by *Fusarium solani* f. *fabae* and wilt by *F. oxysporum* f. *fabae*.

429. HELY, P. C.

Bean fly control.

Agric. Gaz. N.S.W., 1948, 59: 419-20.

Further data showing that DDT sprays offer certain advantages over the standard nicotine sulphate-white oil treatment for the control of the bean fly (*Agromyza phaseoli*) [H.A., 17: 1590]. Spraying at weekly intervals, instead of the usual 3 or 4 days periods, has proved satisfactory.

430. NILSSON, F.

Sortförsök med köksväxter i Norrland. IV. Sockerärter 1938-1947. (Variety trials with vegetables in Norrland, Sweden. IV. Sugar peas, 1938-1947.) [English summary, maryl, pp. 23.]

Reprinted from *Årsskr. Alnarps Lantbruks-, Mejeri-, Trädgårdstinst.*, 1948, pp. 171-224, bibl. 16, as *Meddel. Trädgårdsförs.* 46.

Tall, medium-tall and dwarf edible-pod peas were included in these trials, as the result of which recommendations for each category are made.

431. WELLENSIEK, S. J.

Pisum-crosses VII: "Springers".

Reprinted from *Genetica*, 1946 (?), 24: 65-73, bibl. 9 [received 1948].

"Springers" with an average stem length of 80 cm. are known to occur occasionally in dwarf pea strains of a height of 40 cm. The author's breeding experiments show that the "springer" character is not due to mutation, as has been suggested, but to double recessive segregation.—Inst. Plantenveredeling, Wageningen.

432. CHRISTIANSEN, G. S., AND OTHERS.

The action of growth inhibitors on carbohydrate metabolism in the pea.

Plant Physiol., 1949, 24: 178-81, bibl. 4.

Plant growth ceases in the presence of certain inhibitors of enzymes acting on the breakdown of carbohydrates. Experiments carried out at the Harvard Biological Laboratories, with sections of the Alaska pea, show that more reducing sugar is consumed in presence of the inhibitors, in spite of the fact that it is not being used for growth. As it is not consumed in respiration, nor combined to form starch or dextrins, it is concluded that the inhibitors cause the conversion of reducing sugars to substances of a non-carbohydrate nature.

433. ROBINSON, W. O., AND EDGINGTON, G.

Toxic aspect of molybdenum in vegetation.

Soil Sci., 1948, 66: 197-8.

In the data tabulated it is shown that pea seed from a high selenium area in Colombia, S.A., contained MoO_3 in a concentration highly toxic to cattle and humans.

434. HARLAND, S. C.

Inheritance of immunity to mildew in Peruvian forms of *Pisum sativum*.

Heredity, 1948, 2: 263-9, bibl. 7.

Susceptibility to the mildew *Erysiphe polygoni* in a Peruvian form of pea is governed by a single dominant gene, which may be of value in temperate lands.—Institute of Cotton Genetics, Lima.

435. INKILÄ, O.

Hernekääriäisen (*Grapholitha nigricana* Steph.) peltoherneelle aiheuttamista vahingoista. (*Grapholitha nigricana*, an injurious pest of field peas.) [English summary ½ p.] *Maataloust. Aikakausk.*, 1948, 20: 58-66, bibl. 17.

In recent years *Grapholitha nigricana* has assumed increasing importance as a pest of field peas in Finland, losses at the Agricultural Experiment Station, Jokioinen, in 1947 amounting to 9-8% and the percentage of damaged peas to 32.8. Early varieties and those with a long flowering period are liable to suffer the greatest damage. Warm and dry weather at flowering time is another factor favouring the pest.

436. SCHLOSBERG, M., AND BAKER, W. A.

Tests of sweet corn lines for resistance to European corn borer larvae.

J. agric. Res., 1948, 77: 137-56, bibl. 10.

Of 977 sweet corn inbreds examined for resistance to

larvae of the European corn borer (*Pyrausta nubilalis*) none was immune, but 44 did show some resistance. The results of single crosses indicated incomplete dominance of either resistance or susceptibility. Intercrosses of resistant and susceptible parents generally showed results intermediate between those obtained for crosses within resistant and susceptible groups of inbreds.

437. KENNELLY, A. G.

The growing of mushrooms.

N.Z. J. Agric., 1948, 77: 157-60, illus.

Describes the general cultivation of mushrooms together with notes on their insect pests and diseases and measures of control.

Potatoes.

(See also 357, 482, 483, 715.)

438. SCOTTISH SOCIETY FOR RESEARCH IN PLANT BREEDING.

Report by the Directors and Report by the Director of Research. *Scot. Soc. Res. Plant Breeding for 1947*. 1948, pp. 46, bibl. 20.

Progress is reported in breeding potatoes for resistance to blight and the virus diseases. By replacing the grafting test with one of leaf inoculation, wherever possible, and by using serological tests for recovery of the X viruses, much more material can be tested for field immunity; these methods save time and space. Of the seedlings now being tested, descriptions of two named varieties have been published [*Scot. Agric.*, 1948, 27: 237; *H.A.*, 18: 1176]. Some seedlings have a greater vitamin C content than standard commercial varieties.

439. DEPARTMENT OF AGRICULTURE FOR SCOTLAND.

New varieties of the potato introduced since 1939.

Leaf. Dep. Agric. Scotland 2 (n. s.), 1948, pp. 8, 3d.

The Scottish Scheme for the registration of potato varieties had been suspended during the war. Since normally it takes 3 years to complete the tests necessary for registration, there was a lapse of 8 years during which new varieties appeared on the market in the absence of official guidance for the grower. It is the object of the leaflet to take stock of the position. The varieties are grouped in 7 classes, the first of which contains 3 varieties recommended for registration, two of them blight-resistant as a result of deliberate breeding. The rules governing the registration trials are set out.

440. WAGENINGEN.

Twenty-third descriptive list of varieties of field crops. Potato varieties.

[Publ.] Govt. Cttee for the Compilation of the List of Varieties of Field Crops, Wageningen, 1948, pp. 45.

The varieties are classed in five groups, three of which express relative importance on the Dutch market. A fourth group is devoted to new varieties and a fifth to varieties reserved for export only, because they are unsuitable for general cultivation in Holland. The merits and uses of every variety are discussed.

441. SELLSCHOP, J. P. F., AND DU TOIT, J. J.
The production of potatoes [in S. Africa].
Fmg. S. Afr., 1948, 23: 645-54, illus.

A practical article for farmers on potato growing in the Union covering all the usual field operations, as well as manuring, irrigating, choice of seed and its treatment before planting. Up-to-Date is the best variety in the summer rainfall area. In the western Cape Province Arran Chief, King George, Green Mountain, Katahdin and Up-to-Date are popular.—Coll. of Agric., Potchefstroom.

442. GOURLAY, W. B.
Mexico and wild potatoes.
Gdnrs' Chron., 1948, 124: 174-5, 182-3, 190, illus.

A popular lantern talk on the 1937 expedition, sponsored by the Imperial Agricultural Bureaux, to collect wild and cultivated potatoes.

443. J., D.
Potato growing in Germany.
Agric. Engng Rec., 1948, 2: 184-6, illus.

An account of cultural and harvesting practices in Germany, where 80% of the farms are less than 60 acres. A multi-row toolbar implement is illustrated to which dibbling wheels, ridging bodies, or hoes can be fixed, as required. Before harvest, the haulm is either mown down, or destroyed by a 3-row power-driven machine working like a hammer mill. The majority of farmers lift their potatoes by spinner, many machines being fitted with a cleaning drum at the side. Most of the crop is stored in clamps, which in many cases are covered by a tractor-drawn implement, 4 bouts being enough to cover a clamp to a thickness of 10 in. on medium soils. The introduction in Germany of shallow planting has resulted in considerable economy in potato cultivations.

444. IVINS, J. D., AND McDERMOTT, N.
Early planting of maincrop potatoes.
Agriculture, 1949, 55: 452-3.

An account of a trial laid down in 1948 to determine the loss due to late planting of potatoes. Sprouted (boxed) seed of Majestic certified A (Scot) was used, planted on 3 dates, at 3-weekly intervals beginning 5 April. The crops were lifted on 5 October. The results confirm that delayed planting may seriously reduce yield. The greatest loss occurred with the third planting, where a delay of three weeks resulted in a loss of 3.69 tons of ware per acre—a loss of 3.5 cwt. per acre for each day's delay in planting.—Sutton Bonington, Loughborough, England.

445. THIESSEN, E. J.
The culinary qualities and nutritive values of potatoes grown upon dry and irrigated land.
Bull. Wyo. agric. Exp. Stat. 280, 1947, pp. 3-30, bibl. 16.

The chief varieties used in this investigation were Irish Cobbler and Bliss Triumph, the main purpose being to measure (1) variables existing in the culinary qualities of these two varieties and (2) differences in the same variety from year to year. Other objects were to determine the factors responsible for such differences and the effect of storage and growing conditions on the nutritive value. Detailed results are presented.

446. BAIRD, E. A., AND HOWATT, J. L.
Ascorbic acid in potatoes grown in New Brunswick.
Canad. J. Res., 1948, 26, Sec. C, pp. 433-44, bibl. 19.

The amount of ascorbic acid in potatoes grown in New Brunswick was determined during the period of growth and subsequent storage for the 1946-1947 season. Ascorbic acid was highest in August, varying from approximately 150 to 200 mg. per 100 g. of dry weight of potato tissue. It decreased to about half that amount in December, and to about a quarter of the original value by the following May. The eye end of the potato contained about 20% more ascorbic acid than the stem end. No correlation was observed between ascorbic acid content of potatoes and either fertilizer or variety. [From authors' conclusions.]—University of New Brunswick, Fredericton.

447. FULTS, J. L., AND SCHAAL, L. A.
Red skin color of Bliss Triumph potatoes increased by the use of synthetic plant hormones.
Science, 1948, 108: 411.

During experiments with 2,4-D on this potato variety an increase in the red skin colour was noted—a finding that may prove of economic importance, since a deep red colour is a highly desired market character in Bliss Triumph.

448. ELLISON, J. H., AND SMITH, O.
Effects of spraying a sprout inhibitor on potato plants in the field.
Proc. Amer. Soc. hort. Sci., 1948, 51: 397-400, bibl. 2.

These trials at Ithaca, N.Y., indicate that the method of spraying potatoes in the field with the methyl ester of α -naphthaleneacetic acid (MENA), while still needing investigation as regards date of application and strength of solution, holds distinct promise of satisfactorily checking growth in storage.

449. CASSERES, E. H.
Las papas—importancia del abono y variedades resistentes en su producción. (The importance of manuring and of resistant varieties in potato cultivation in Costa Rica.)
Publ. téc. Interamer. Inst. agric. Sci. 27, 1948, p. 1.

In 1945 the Interamerican Institute of Agricultural Science in Costa Rica worked out a programme for the improvement of potato yields, manurial trials and the breeding of better varieties being the two main lines of research. The effect of N, P and K, in different combinations and proportions, was studied on crops grown on volcanic soils. Statistical analyses showed that under local conditions superphosphate raised the yield considerably, sulphate of ammonia was beneficial, but potassium was of no benefit whatever. Further experiments are in progress. New varieties resistant to *Phytophthora infestans* were bred at Cornell University from the native *Solanum demissum*, and were sent for trial to Costa Rica in 1945. EVI, 2 proved to be the variety best adapted to conditions there. It has white tubers, blight resistant foliage and is of good quality. In 1947 other new varieties were tried in the high potato growing regions of Costa Rica.

Harford and Fillmore, both vigorous and prolific, were well suited. These and other varieties are now being raised in quantity, and tested in many other districts.

450. HAWKINS, A., CHUCKA, J. A., AND MAC-KENZIE, A. J.

Fertility status of potato soils of Aroostook County, Maine, and relation to fertilizer and rotation practices.

Bull. Me agric. Exp. Stat. **454**, 1947, pp. 223-66, bibl. 9.

It has become customary with many potato growers to apply certain amounts of potash and phosphate to the crop, irrespective of fertility conditions. This practice has led to an accumulation of the two elements in the soil and to an unnecessary expenditure in fertilizers and labour. On soils containing 500 lb. or more of readily soluble P_2O_5 or 500 lb. of exchangeable K_2O per acre maximum yields were obtained in 4 years' trials with applications of 80-120 lb. P_2O_5 and 100-200 lb. K_2O . On soils with a medium to low content of available phosphate and potash, dosages of up to 200 lb. of both nutrients proved beneficial.

451. GAROLA, J.

Observations et expériences sur le rôle de la fumure phosphatée en Eure-et-Loir. (The role of phosphate fertilizers in the Department of Eure-et-Loire.)

Ann. agron., Paris, 1948, **18**: 452-61, bibl. 11.

Potatoes are among the farm crops considered. The trials showed that insufficient phosphate applications may result in yield losses of up to 47 quintals of tubers per hectare.—Station Agronomique de Chartres.

452. ROSS, A. F., CHUCKA, J. A., AND HAWKINS, A.

The effect of fertilizer practice including the use of minor elements on stem-end browning, net necrosis, and spread of leafroll virus in the Green Mountain variety of potato.

Bull. Me agric. Exp. Stat. **447**, 1947, pp. 97-142, bibl. 18.

The incidence of stem-end browning and of net necrosis in the stored potatoes from a series of permanent soil fertility plots was markedly affected by fertilizer practice. The amount of stem-end browning in the crop was positively correlated with the amount of chloride and potassium applied in the fertilizer and that of net necrosis to the amount of phosphorus and chloride. These factors are contributory rather than causal. Other fertilizer constituents had little or no effect. The tendency of plots receiving fertilizer mixtures high in phosphorus to produce a crop with a high percentage of tubers affected with net necrosis was found to be due primarily to a greater spread of leafroll virus on such plots. In the case of plots receiving mixtures with a high chloride content, high net necrosis percentages were not only due to a greater spread of leafroll virus but also to a greater tendency of leafroll tubers from such plots to develop net necrosis. Recommendations include the use of fertilizers low in chloride and a reduction in the amount of phosphorus and potash applied where such reductions can be made without yield reductions. [From authors' summary.]

453. WEST, W. J.

Potato sorter trials.

Agric. Engng Rec., 1948, **2**: 148-9.

A comparison of British and American sorter models at the Scottish Agricultural Testing Station showed that although the British machine delivered a pure sample of seed potatoes, many seed potatoes were delivered with the ware. The American machine worked well at higher rates of feeding than were possible with the British machine, and it damaged fewer potatoes, but re-setting of the grading rollers was necessary for ware and seed samples of potatoes.

454. SAUKKO, P.

Viljelyskasvien Vedenkestämiskyvystä. (The resistance to flooding of cultivated plants.)

[German summary 1 p.]

Maataloust. Aikakausk., 1946, **18**: 97-114, bibl. 6 [received 1948].

Plants considered include potato. It appears that the crop was lost when the water reached a level of 10 cm. below the surface of the soil.

455. JAMALAINEN, E. A.

The significance of potato virus diseases in Finland.

Maataloust. Aikakausk., 1946, **18**: 134-43, bibl. 19 [received 1948].

Virus diseases of potato were introduced into Finland with foreign seed imported by experiment stations for breeding purposes. Their economic significance, however, is negligible, even in the southern provinces, owing to the severe climate which does not favour aphid vectors. Farmers use their own seed without any symptoms of degeneration appearing. It is suggested that the absence of virus infection in the central and northern parts of the country should put Finland in a position to become an exporter of seed potatoes. The regulations appertaining to the sale of seed potatoes—of which 3 classes are recognized—are outlined. The most widely grown variety, Rosa-folia, was found to be particularly resistant to virus diseases.

456. BROADBENT, L.

Aphis migration and the efficiency of the trapping method.

Ann. appl. Biol., 1948, **35**: 379-94, bibl. 22.

Reproducible results were obtained when adhesive traps (stove-pipe types) for aphides were placed at the same height in different parts of a potato field. There was less variation in numbers caught on traps at 3-4 ft. than at 5-6 ft. above the ground, or at ground level. Brilliant yellow traps caught more aphides than white traps, and the latter more than black.—Rothamsted Experimental Station.

457. HAUSCHILD, I.

Zur Beurteilung des Pflanzgutwertes von Saatkartoffelfeldern unter Berücksichtigung des Auftretens der Überträger der Kartoffelvirosen. Versuch einer rechnerischen Lösung des Problems. (The evaluation of seed potatoes in the field, with special reference to the incidence of virus vectors. A mathematical approach.)

Züchter, 1947, **17/18**: 241-7, bibl. 4 [received 1949].

The number of visibly diseased plants in a field of seed potatoes will not reflect the true health position, since new, as yet symptomless, infections will remain unobserved. By taking aphid incidence into consideration a better prognosis can be made. A differential equation is suggested, which should express quantitatively the relationship between aphid incidence and spread of virus diseases. It is proposed to produce a table or graph to enable the grower to estimate, from aphid counts, the percentage of symptomless infected plants.—Celle branch of the Biologische Zentralanstalt for the British and U.S. Zones of Germany.

458. BROADBENT, L., AND GREGORY, P. H.
Experiments on the spread of rugose mosaic and leaf roll in potato crops in 1946.

Ann. appl. Biol., 1948, 35: 395-405, bibl. 7.

Observations at 13 centres in England and Wales showed that in 1946, 69% of the infections with virus Y (rugose mosaic) and 48% of those with leaf-roll virus reached the tubers of Majestic potatoes by the beginning of August. There was usually little subsequent increase of rugose mosaic, but a late increase of leaf roll was associated with a relatively high initial spread. Three-quarters of the virus Y and over half the leaf roll infections occurred within five plants distance of the source.—Rothamsted Experimental Station.

459. BAWDEN, F. C., AND KLECZKOWSKI, A.
Variations in the properties of potato virus X and their effects on its interactions with ribonuclease and proteolytic enzymes.

J. gen. Microbiol., 1948, 2: 173-85, bibl. 14.

When concentrated by precipitation with acid and salts, or by high speed centrifugation, potato virus tends to become insoluble though still infective and serologically active, and this complicates purification. Ribonuclease readily hydrolyses the nucleic acid derived from virus X.—Rothamsted Experimental Station.

460. FOLSOM, D., GETCHELL, J. S., AND BONDE, R.
Bacterial red xylem disease of potato tubers in Maine.

Plant Dis. Repr., 1948, 32: 230-1.

A preliminary description of the symptoms and of the causal organism.

461. DAVIDSON, R. S.
Factors affecting the development of bacterial soft rot of potato tuber initials.

Phytopathology, 1948, 38: 673-87, bibl. 32.

Potato tuber initials can be completely rotted at very early stages in their development, especially in wet soils, by at least 4 species of bacteria: *Erwinia carotovora*, *E. aroideae*, *Bacillus mesentericus* and *B. poly-myxa*. Infection occurs through lenticels; it is retarded by soil temperatures of 18° C. and lower, and is accelerated at higher temperatures. The relative prevalence of the organisms may vary in different regions or soils.

462. MCGOLDRICK, F., AND SMITH, O.
Killing potato vines.

Proc. Amer. Soc. hort. Sci., 1948, 51: 401-5.

Successful trial of numerous proprietary substances

with notes on effect on yield of different dates of treatment. The value of tubers as seed was probably not significantly affected.

463. HARRY, J. B., AND OTHERS.
Development of copper-zinc-chromate complexes as potato fungicides.

Contr. Boyce Thompson Inst., 1948, 15: 195-210, bibl. 12, illus.

Laboratory and greenhouse bioassays indicated the fungitoxic properties of the chromate complexes and established the range of chromate solubility useful on plants in foliage to be below 0.03% to avoid phytotoxicity and above 0.0001% to ensure fungitoxicity. Performance as potato fungicides was found to be correlated with ratios of zinc to copper to chromium, and completeness of reaction of the product. A medium high-copper low-zinc-chromate complex, coded 658, was as efficient at about 2 lb./100 gal. as 4 to 6 lb. of low-copper high-zinc-chromate complex, coded 169. Chromates at little more than one-third the copper content of fixed coppers and bordeaux mixture were shown to be more effective over a wide variety of geographical and disease ranges. [From authors' summary.]

464. J., M.

Répartition, sensibilité au mildiou des tubercules des variétés de pommes de terre cultivées en Suisse romande. (Distribution and susceptibility to blight of potato varieties grown in French-speaking Switzerland.)

Rev. romande Agric. Vitic., 1948, 4: 74.

Of 15 varieties tested, Bintje, by far the most popular potato, ranked third in blight susceptibility, with 22.9% of the tubers infected in spite of two copper treatments. The Swiss research stations are engaged in the search for a variety which is equally acceptable to the consumer but more blight-resistant.

465. ANON.

Aardappelmoeheid: (Potato sickness.)

Vlugschr. PI Ziektdienst Wageningen 62, 1948, pp. 4, illus.

Potato sickness caused by the potato eelworm, *Heterodera rostochiensis* Wollenweber, is stated to be the most dangerous and stubborn of the diseases of potato and tomato. The distribution and life history of the pest are outlined and the symptoms of the disease described. The difficulty of controlling it, because of its persistent cysts and the ease with which they are distributed, is pointed out. The cysts may be carried about by implements, horses, wind, water, on workmen's shoes, etc., and particularly on seed potatoes. Efforts should be directed to starving out the eelworm by growing resistant crops (so far as is known only potatoes and tomatoes are susceptible) for about 10 years.

466. ELLENBY, C.

Resistance to the potato-root eelworm.

Nature, 1948, 162: 704, bibl. 3.

Testing tuber-forming *Solanum* species for immunity and resistance to the potato-root eelworm the author found *S. ballsii* to be "exceptionally resistant".—King's College, Newcastle-upon-Tyne.

467. MAYNÉ, R., AND BRENY, R.
Troilus luridus F., morphologie, biologie.
 Determination de sa valeur d'utilisation dans
 la lutte biologique contre le doryphore de la
 pomme de terre. (The morphology and
 biology of *Troilus luridus* and a consideration
 of its value in the biological control of the
 Colorado beetle.) [Summary in English and
 German.]
Parasitica, 1948, 4: 131-51, bibl. 20, illus.
 The authors conclude that this hemipterous insect,
 from its habits and the places it frequents, is of no
 value in the biological control of the Colorado beetle.

Tobacco.

(See also 714, 719.)

468. MARSH, J. F., AND OTHERS (U.S.D.A.,
 BUREAU OF AGRICULTURAL ECONOMICS).
*Tobaccos of the United States, acreage,
 yield per acre, production, price, and value by
 states, 1866-1945, and by types and classes,
 1919-1945.*
 (Publ.) *Bur. agric. Econ., U.S.D.A., Wash.,*
 1948, pp. 82.
 A report presenting a continuous series of tobacco
 statistics by States.
469. CALVERT, J.
 The inhibition of suckering in tobacco by
 chemicals.
J. Aust. Inst. agric. Sci., 1948, 14: 146-7,
 bibl. 2.
 The suckering of tobacco is time-consuming, and if it
 could be reduced or eliminated, production costs would
 be lowered. With this in mind, the reactions of four
 esters of 2,4-dichlorophenoxyacetic acid on the develop-
 ment of axillary growth in tobacco were observed, in
 pot experiments. The summarized results show
 evident differences between treated and untreated
 plants and indicate strong possibilities of the axillary
 growth having been inhibited. Work is being con-
 tinued.—Div. of Plant Ind., C.S.I.R., Canberra.

470. McEVoy, E. T.
 Construction and management of tobacco
 seedbeds.
Fmrs' Bull. Dep. Agric., Canada 148, being
Publ. 806, 1948, pp. 25, illus.
 A comprehensive, well illustrated bulletin containing
 the results of trials made by the Tobacco Division,
 Central Experimental Farm, Ottawa, and associated
 Dominion Experimental Stations.

471. BERÉNYI, D.
 Mikroklímatikus mérések dohányban és
 napraforgóban. (Microclimatological obser-
 vations on tobacco and sunflower [in Hungary].
 [English summaries.]
Bull. met. Inst. Univ. Debrecen 8, 1948,
 pp. 59, from review in *Met. Mag.*, 1948,
 77: 258-60.
 An account of measurements of the effects of planting
 distance and variety on microclimate in tobacco.
 It is concluded that the Szabolcsi variety, in which air
 and soil temperatures and evaporation are lower than
 in Debrecen, is the more suitable in dry regions.

In a second paper a comparison is given between
 measurements in sunflowers and in Debrecen tobacco,
 taken at ranges of heights which were different in
 the two crops.

472. COOMBS, R.
 Prospects of tobacco as a crop for British
 growers.
Grower, 1948, 29: 926-7.
 A grower's account of his method of raising tobacco
 transplants at Ross-on-Wye, with notes on cultivation.
 The Excise regulations are summarized.

473. VAN ROOYEN, C. F.
 The nicotine content of tobacco.
Fmg S. Afr., 1948, 23: 547-52.
 An account is given of experiments designed to study
 the influence of close spacing of plants on the nicotine
 yield of (1) a high-nicotine selection of *Nicotiana*
rustica and (2) Medole 73, a high-yielding, heavy snuff
 type of fairly high nicotine content. The former,
 spaced at 6 in. in rows 3 ft. apart, yielded an average
 of 231 lb. nicotine per morgen (=2.1164 acres), on a
 dry weight basis, over 3 years. It is concluded that if
 tobacco is grown in future for nicotine production
 preference must be given to the *rustica* type and that
 the highest yield will be obtained from spacing the
 plants at 6 in. in rows 3 ft. apart.—Rustenburg Tobacco
 Res. Stat., S. Africa.

474. FORBES, A. P. S.
 A note on *Nicotiana rustica* or nicotine
 tobacco.
Nyasaland agric. Quart. J. 1948 7: 35-40.
 In Nyasaland *Nicotiana rustica* is grown by African
 farmers as a winter crop on rich alluvial land near
 streams; the leaf is used for making snuff. Local
 types contain about 6% nicotine. The crop can also
 be grown in the summer after the main rains break.
 Seedlings are transplanted at 3 ft. × 2 ft. and the plants
 must be topped and suckered; dressing with sulphate
 of ammonia is desirable. After about 3 months the
 crop is harvested and air-cured in the shade.

475. LEWIS E. B., CARD, D. G., AND McHARGUE,
 J. S.
 Tobacco stalks, hemp hurds, and sorghum
 bagasse as sources of cellulose for making
 high-quality paper.
Bull. Ky agric. Exp. Stat. 515, 1948, pp. 14.
 Paper of good quality can be made from tobacco
 stalks. They also have a high value as manure, but
 as much of this could be recovered in making paper
 their use for this latter purpose seems feasible.

476. ASKEW, H. O., BLICK, R. T. J., AND WATSON,
 J.
 Flue-cured tobacco. IV. Effect of position
 on the plant on chemical composition of
 tobacco leaf.
N.Z. J. Sci. Tech., 1947, 29, Sec. A, pp.
 158-63, bibl. 1.

The midrib was outstandingly high in potash and was
 generally richer in lime, magnesia and phosphoric acid,
 but generally lower in nitrogen than the corresponding
 blade of the leaf. Nicotine increased from the bottom
 to the top of the plant.

477. MIDDELBURG, H. A.

Constant wet-bulb temperature for proper flue-curing of tobacco.

Chron. Nat., 1948, 104: 145-8.

A review of some theoretical, basic principles governing the drying of wet materials precedes an account of curing experiments using insulated micro-barns, holding 300 leaves, in which temperature, humidity, ventilation, and loss in weight could be controlled, within certain limits. The results confirm that a good quality cured leaf is obtained if the wet-bulb temperature in the barn is kept constant. "The desirable differences between dry- and wet-bulb temperature for the successive stages of the curing process are automatically indicated for any given kind of leaf and air condition, because, when the wet-bulb temperature is kept constant, while the dry-bulb temperature is increasing, moisture is carried off from the barn at the same rate at which it is given off by the tobacco. And this is the fundamental principle for proper flue-curing, by which the desirable regularity in the management with different leaf and air conditions is obtained. Flue-curing develops favourably at constant wet-bulb temperature between 32 and 38 degrees Centigrade. Tobacco that is less suitable for flue-curing should be dried at a low temperature so as to lessen the danger of the leaves remaining green."—Tobacco Exp. Stat., Klaten, Java. [See also *H.A.*, 18: 2020.]

478. KINCAID, R. R.

Soil fumigation for cigar-wrapper tobacco in Florida.

Abstr. in *Phytopathology*, 1948, 38: 570.

In soil fumigation tests using dichloropropene-dichloropropane mixture (20 gal. per acre) and ethylene dibromide (10% at 30 gal. per acre) the treated crop showed reduction in root knot and coarse root (nematode root rot), increases in yield, and no important differences in grade and fire-holding capacity of the leaves.

479. BEST, R. J.

Studies on a fluorescent substance present in plants. Part 3: The distribution of scopoletin in tobacco plants and some hypotheses on its part in metabolism.*

Aust. J. exp. Biol. med. Sci., 1948, 26: 223-30, bibl. 7, illus.

In healthy tobacco plants the concentration of scopoletin is greatest in the internal and external endodermis; its relative distribution in plants infected with tomato spotted wilt virus is as in healthy plants, until the plant becomes saturated and all parts fluoresce brightly. It is suggested that the excess production of scopoletin in virus-infected plants is the result of a diversion of normal metabolism, rather than the direct result of a breakdown of lignin or other substance. [From author's summary.]—Waite Agric. Res. Inst., University of Adelaide.

480. BEST, R. J.

The constancy of chemical composition and infectivity per unit weight of tobacco mosaic virus protein prepared over a period of years.

Reprint from *Aust. J. exp. Biol. med. Sci.*, 1948, 26: 65-9, bibl. 9.

Tests of 17 samples of the virus taken during 9 years showed that there was no significant difference between the infectivity per unit weight.

481. BEST, R. J.

Longevity of tobacco mosaic virus. Part 1. *In vitro* life of the pure virus in buffer solution at pH 4.

Reprint from *Aust. J. exp. Biol. med. Sci.*, 1948, 26: 163-9, bibl. 6.

The sample of virus tested has maintained its infectivity unchanged for 12 years.

482. ROZENDAAL, A., AND VAN DER WANT, J. P. H.

Over de identiteit van het ratelvirus van de tabak en het stengelbontvirus van de aardappel. (On the identity of the rattle virus of tobacco and the stem-mottle virus of potato.) [English summary 4 pp.]

Tijdschr. PlZiekt., 1948, 54: 113-33, bibl. 6, illus.

Inoculation experiments show that the tobacco rattle virus and the potato stem-mottle virus are the same, and this is confirmed by field and pot trials. It is concluded that potatoes planted on soil contaminated with rattle virus may become affected with the stem-mottle disease. The virus occurs not only in the upper, but also in the lower, layer of soil tested.

483. VAN DER WANT, J. P. H., AND ROZENDAAL, A.

Electronen-microscopisch onderzoek van het virus dat de ratelziekte van de tabak en het stengelbont van de aardappel veroorzaakt. (An electron microscope study of the virus causing rattle disease of tobacco and stem-mottle of potato.) [English summary 1 p.]

Tijdschr. PlZiekt., 1948, 54: 134-41, bibl. 8, illus.

When examined under the electron microscope the tobacco rattle and the potato stem mottle virus rods were found to be similar, whether the sap of diseased plants was purified by the chemical method or by the quick method described.

484. KASSANIS, B., AND KLECZKOWSKI, A.

The isolation and some properties of a virus-inhibiting protein from *Phytolacca esculenta*. *J. gen. Microbiol.*, 1948, 2: 143-53, bibl. 19.

An inhibitor of plant viruses which can be isolated from the sap of *Phytolacca esculenta*, is probably a glycoprotein. It can precipitate tobacco mosaic and tomato bushy stunt viruses.—Rothamsted Experimental Station.

485. COSSLETT, V. E.

Summarized proceedings of conference on electron microscopy—Leeds, September, 1947. *J. sci. Instrum.*, 1948, 25: 167-70.

This article includes an abstract of a paper by Dr. F. M. Sheffield (Rothamsted Experimental Station) on some cytological studies of virus-infected plants. In cells infected with tobacco mosaic virus, the virus particles are located not only in the cell nucleus, but in other parts of the cell also.

486. BAWDEN, F. C., AND ROBERTS, F. M.

Photosynthesis and predisposition of plants to infection with certain viruses.

Ann. appl. Biol., 1948, 35: 418-28, bibl. 5.

* For Part 2 see *ibid.*, 1944, 22: 251-5; *H.A.*, 16: 256.

The effects on susceptibility to infection with certain viruses (tobacco necrosis virus in French bean and tobacco, tomato aucuba mosaic virus in tobacco, and tobacco mosaic and tomato bushy stunt viruses in *Nicotiana glutinosa*) under various periods of darkness or reduced illumination before and after inoculation were tested. Susceptibility was increased by pre-inoculation treatments of host plants, but post-inoculation treatments had little effect and often decreased susceptibility. Short periods in the dark produced responses similar to those of longer periods in shade, but the different plants varied in response to, and tolerance of, darkness. The successful establishment of infection is discussed in relation to these results.—Rothamsted Experimental Station.

487. HOPKINS, J. C. F.

Field spraying and the control of leaf diseases of tobacco.

Pl. Path. Pap. Dep. Agric. S. Rhod. No. 1, 1948, pp. 21, bibl. 14, illus.

Field spraying on commercial lines can control Alternaria spot (*A. longipes*), frog-eye spot (*Cercospora nicotianae*) and angular spot (*Pseudomonas angulata*), but the technique in Rhodesia can be improved by the adoption of more suitable kinds of spray machine and the use of more efficient fungicides.

488. VAN DER VEN, R., AND VAN DER WANT, J. P. H.

***Thielaviopsis basicola* (Berk. et Br.) Ferraris als veroorzaker van een voor Nederland nieuwe ziekte van de tabak. (*Thielaviopsis basicola* the cause of a tobacco disease new to the Netherlands.)**

Tijdschr. PlZiekt., 1948, 54: 142-6, bibl. 12, illus.

Tobacco black root rot has been reported for the first time in Holland, in seed beds in the Maas and Waal district, particularly on the variety Kentucky Italiana.

489. JENKINS, W. A.

Root rot disease-complexes of tobacco in Virginia. I. Brown root rot.

Phytopathology, 1948, 38: 528-41, bibl. 12, illus.

Tobacco affected by brown root rot shows symptoms of drought injury. The disorder is started by meadow nematodes, *Pratylenchus pratensis* (de Man) Filipjev consistently producing severe symptoms. Soil fumigation appears to offer permanent control when used with vigorous varieties of tobacco.

Hops and other crops.

(See also 679b.)

490. THOMAS, P. H.

The Tasmanian hop industry.

Tasm. J. Agric., 1948, 19: 79-87, illus.

A general account of the hop plant, of its cultivation and of hop drying. The varieties grown in Tasmania in order of ripening with approximate percentage of total crop are: Fuggles (10); Whitebine Grape (40); Kent Golding (30); American Golden Cluster (10); Lates (10).

491. WEISS, F.

Check list revision.

Plant Dis. Repr., 1948, 32: 402-24.

On pp. 420 and 421 is a list of 20 diseases of hop, with the names of the parasites and the distribution of the diseases in U.S.A.

492. KEYWORTH, W. G.

Verticillium wilt of the hop (*Humulus lupulus*). IV. Study of a fluctuating outbreak.

J. hort. Sci., 1948, 24: 149-56, bibl. 6.

The study of a fluctuating outbreak of verticillium wilt of the hop, during 1943-45, is described. The distribution of plants bearing infected cuttings was determined in relation to the distribution of plants showing symptoms in 1943 and the subsequent symptom history of these plants was noted. Some evidence that the pathogen was widespread throughout the field is given and it is concluded that the localization of the plants showing symptoms is due to environmental conditions. No evidence could be obtained of any correlation between this localization and soil structure. [Author's summary.]—E. Malling Res. Stat., Kent.

493. SANDERS, M. E.

Embryo development in four *Datura* species following self and hybrid pollinations.

Amer. J. Bot., 1948, 35: 525-32, bibl. 19, illus.

It has been found that in *Datura* species the non-viable seeds resulting from interspecific crosses may contain arrested embryos that can be dissected out and grown to maturity in artificial culture. This work done at Yale University is a study of the embryo development of certain *Datura* species and their interspecific crosses, as a preliminary to the study of the embryos grown in culture.

494. UTKIN, L. A., AND LEVANDOV, L. Ja.

The soft lungwort and its popular medicinal value. [Russian.]

Priroda (Nature), 1948, No. 8, pp. 66-7.

The soft lungwort, *Pulmonaria mollissima* Kern., is used as a popular remedy, for various ailments and injuries, by the inhabitants of western Siberia. Chemical analysis shows that it is rich in manganese and this probably accounts for its medicinal properties. Its ash also contains potassium, calcium and iron.

495. POUND, G. S.

Horseradish mosaic.

J. agric. Res., 1948, 77: 97-114, bibl. 13, illus.

Horseradish plantings in Wisconsin, Missouri and Washington are nearly all affected with mosaic. Seven viruses isolated agreed very closely with cabbage virus A and cabbage black ring virus. They are designated as strains of turnip virus 1.—Wisconsin agric. Res. Stat.

496. SEVERIN, H. H. P., AND DRAKE, R. M.

Sugar-beet mosaic.

Hilgardia, 1948, 18: 483-521, bibl. 54, illus.

Refers to Californian investigations which included tests on host range, symptomatology, properties of the virus, and various aspects of transmission by insects, especially aphids. Apart from sugar-beet, the following, amongst other plants, were demonstrated to be

naturally infected with sugar-beet-mosaic virus: garden beet, Swiss chard, and spinach.

Noted.

497.
 - a ANDRUS, C. F.
A method of testing beans for resistance to bacterial blights.
Phytopathology, 1948, **38**: 757-9, illus.
 - b ANON.
Culture de la pomme de terre en Grèce. (Potato growing in Greece.)
Pomme de Terre franç., 1948, **11**: 109: 10-11.
 - c ANON.
La production du plant en Finlande. (Potato growing in Finland.)
Pomme de Terre franç., 1948, **11**: 109: 14.
 - d BARNES, W. C.
The performance of Palmetto, a new downy mildew-resistant cucumber variety.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 437-41, bibl. 4.
For autumn production in the South-Eastern U.S.A.
 - e BEHR, L. L.
Krankheiten und Schädlinge der Gurke sowie deren Bekämpfung. (Diseases and pests of the cucumber and their control.)
Ceres, Hamburg, 1948, **1**: 7/8: 17-20.
 - f BELTON, W. E., AND HOOVER, C. A.
Investigations on the mung bean (*Phaseolus aureus* Roxburgh). I. The determination of eighteen amino acids in the mung bean hydrolysate by chemical and microbiological methods.
J. biol. Chem., 1948, **175**: 377-83, bibl. 9.
 - g BEST, R. J.
Studies on a fluorescent substance present in plants. 2. Isolation of the substance in a pure state and its identification as 6-methoxy-7-hydroxy 1 : 2 benzo-pyrone.
Aust. J. exp. Biol., 1944, **22**: 251-5 [received 1949].
From virus-infected tobacco plants.
 - h BLACK, W. A. P.
The seasonal variation in chemical constitution of some of the sub-littoral seaweeds common to Scotland. Part I. *Laminaria cloustoni*.
J. Soc. chem. Ind. Lond., 1948, **67**: 165-8, bibl. 20.
 - i BLACK, W. A. P.
The seasonal variation in chemical constitution of some of the sub-littoral seaweeds common to Scotland. Part II. *Laminaria digitata*. Part III. *Laminaria saccharina* and *Sacchoriza bulbosa*.
J. Soc. chem. Ind. Lond., 1948, **67**: 169-76, bibl. 9.
 - j BRASHER, E. P.
The effect of plowing and of discing soils on the yields of tomatoes, muskmelons, and potatoes.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 357-8.
Ploughing superior in its results.
 - k BUREAU OF AGRICULTURAL ECONOMICS.
Potato preferences among household consumers.
Misc. Publ. U.S. Dep. Agric. **667**, 1948, pp. 119.
 - l CAMERON, M. C., ROSS, A. G., AND PERCIVAL, E. G. V.
Methods for the routine estimation of mannitol, alginic acid, and combined fucose in seaweeds.
J. Soc. chem. Ind. Lond., 1948, **67**: 161-4, bibl. 15.
 - m CHAKRAVARTY, H. L.
Extrafloral glands of *Cucurbitaceae*.
Nature, 1948, **162**: 576-7, bibl. 1.
Structure and functions discussed.—Royal Botanic Gardens, Edinburgh.
 - n DAVIS, B. H.
Early blight of tomato.
Circ. N.J. agric. Exp. Stat. **515**, 1948, pp. 2.
DAVIS, B. H.
Late blight of tomato.
Circ. N.J. agric. Exp. Stat. **518**, 1948, pp. 2.
 - o DAWSON, R. F.
The alkaloids.
Ann. Rev. Biochem., 1948, **17**: 541-58, bibl. 106.
Dealing with *Cinchona* and *Nicotiana* alkaloids.
 - p DENISEN, E. L.
Tomato color as influenced by variety and environment.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 349-56, bibl. 15.
 - q ESSIG, E. O.
The most important species of aphids attacking cruciferous crops in California.
Hilgardia, 1948, **18**: 407-22, bibl. 67, illus.
 - r FRAZIER, W. A., HENDRIX, J. W., AND KIKUTA, K.
Breeding rust resistant pole green beans for Hawaii.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 468-70, bibl. 7.
 - s GORENZ, A. M., WALKER, J. C., AND LARSON, R. H.
Morphology and taxonomy of the onion pink-root fungus.
Phytopathology, 1948, **38**: 831-40, bibl. 10.
 - t HANLEY, F.
The nutrition and manuring of potatoes.
Farming, 1949, **3**: 11-15, bibl. 11, illus.
 - u JANES, B. E.
The effect of varying amounts of irrigation on the composition of two varieties of snap beans.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 457-62, bibl. 16.
 - v KRAMER, A., GUYER, R. B., AND SMITH, H. R.
A rapid objective method for measuring the color of raw and canned tomatoes.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 381-9, bibl. 4.

- w LARSON, R. E., AND PENG-FI, L.
The influence of various row and plant spacings on yields of lima beans.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 479-85, bibl. 7.
- x MORALES BARRIOS, J.
El cultivo del tomate. (Tomato growing.)
[*Mim. Publ.*] *Minist. Agric. Guatemala* **10**, 1948, pp. 12.
- y NETTLES, V. F.
Two years results of the effect of several irrigation treatments on the yield of cabbage and snap beans.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 463-7, bibl. 5.
- z NILSSON, F., AND LINDWALL, H.
Sortförsök med köksväxter i Norrland. III. Purjo, spenat och sallat 1938-1947. (Variety trials with vegetables in Norrland, Sweden, III. Leeks, spinach and lettuce, 1938-1947.) [English summary 3 pp.]
Reprinted from *Årsskr. Lantbr. Trädgård-sinst.*, 1948, pp. 1-56, bibl. 15, as *Meddel. Trädgårdsförs.* **44**.
498. a RIEDL, W. A.
Potato psyllid and flea beetle control.
Progr. Rep. Wyo. agric. Exp. Stat., March 1944, pp. 2 [received 1948].
- b RIEDL, W. A.
Potato psyllid control.
Progr. Rep. Wyo. agric. Exp. Stat., March 1944, pp. 2 [received 1948].
- c RIEDL, W. A., AND HARRISON, L. R.
The control of psyllids and flea beetles on potatoes.
Bull. Wyo. agric. Exp. Stat. **271**, 1945, pp. 26, bibl. 17, illus. [received 1948].
- d RIOLLANO, A., ADSUAR, J., AND RODRÍGUEZ, A.
Breeding peppers resistant to a Puerto Rican type of mosaic.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 415-16, bibl. 1.
- e RÖSSGER, W.
Niedere Anzuchttemperatur als Ursache der Schosserbildung bei Kohlrabi. (Exposure of seedlings to low temperature as the cause of bolting in kohlrabi.)
Züchter, 1947, **17/18**: 121-46, bibl. 13 [received 1949].
- f STARR, G. H., AND RIEDL, W. A.
Potato ring-rot and its control.
Bull. Wyo. agric. Exp. Stat. **270**, 1945, pp. 16, illus. [received 1948].
- g WADE, B. L.
Important problems in vegetable breeding.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 333-40, bibl. 7.
- h WELLENSIEK, S. J.
Pisum-crosses. VIII: two basic genes for flower-colour.
Reprinted from *Genetica*, 1946 (?), **24**: 74-89, bibl. 14.
- i WHITCOMB, W. D., AND GARLAND, W. J.
Susceptibility of *Cucurbitaceae* to squash borer.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 445-7, bibl. 5.

FLORICULTURE.

(See also 26-28, 30, 31, 210, 298, 312, 691.)

499. O'ROURKE, F. L.
Vermiculite in the cutting bench.
Amer. Nurserym., 1948, **88**: 9: 10-11, 35, illus.
- An account of experiments to determine the best size grade of vermiculite for propagating softwood cuttings of 34 species of woody plants. Grades 1 and 2 (particle sizes $\frac{1}{8}$ to $\frac{1}{16}$ in. and $\frac{1}{32}$ in.) appeared to be most suitable; they gave a general rooting index 50% greater than that in sand [size unspecified].—Michigan State College.
500. GREEN, M., AND FULLER, H. J.
Indole-3-acetic acid and flowering.
Science, 1948, **108**: 415-16, bibl. 2.
- Experiments were conducted to test the assumption by Thurlow and Bonner that, since a marked decrease in the auxin content of plants at the time of their flowering has been demonstrated it might be possible to delay flowering by externally supplying plants with auxin. In the first set of experiments roots of 7-week-old petunias, without flower primordia, were immersed for 24 hours in water solutions of indole-3-acetic acid (200 p.p.m.) before potting in soil. These treated

plants produced their flower buds about 23 days later than the controls. In the second set of experiments young inflorescences of stocks, snapdragons, larkspur, salvia, and iris bearing flower-buds, but no open flowers, were placed with their cut ends in indoleacetic acid solution (25, 50, 100, 150 p.p.m.) for 24 hours before standing them in water. The results indicated that, in all treated plants, the indoleacetic treatment retarded the development of flower buds into open flowers.

501. ALEM, F.
La industria del perfume en Cuyo. (The perfume industry in Cuyo.)
Rev. mens. B.A.P., 1948, **31**: 362: 20-2.
- Describes the cultivation and extraction of oil from peppermint and lavender in the Cuyo region of Argentina. A table is included showing the terpene and essential oil content of these two and of eleven other aromatic plants. The province of Mendoza is considered to have optimum conditions for the cultivation of peppermint and lavender because of its favourable climate and its facilities for irrigation.

502. ROEKENS, F.
Les fuchsias, plantes quelque peu délaissées et
cependant si décoratives. (The fuchsia, a
somewhat neglected but highly decorative
plant.)
Courr. hort., 1948, 10: 590-2.
On the cultivation, propagation, pruning, and types of
varieties of fuchsia, with a short description of the
New Zealand trees fuchsia (*Fuchsia excorticata* L.).
503. BOKE, N. H.
Development of the perianth in *Vinca rosea*
L.
Amer. J. Bot., 1948, 35: 413-23, bibl. 24,
illus.
An ontogenetic approach to the study of the flower
structure of *Vinca rosea*. In the light of the recapitula-
tion theory, it is suggested that ancestral forms of
Vinca existed with spirally arranged leaves and poly-
petalous flowers. Similar developmental studies might
well be used to improve the phylogenetic systems of
classification.
504. MORRISON, B. Y.
More about African violets [*Saintpaulia* spp.].
Nat. hort. Mag., 1948, 27: 168-82, bibl. 7,
illus.
Includes useful information on the native habitat of
Saintpaulia in Tanganyika and its requirements under
cultivation. Several varieties are illustrated.
505. CAMICI, L. 635.936.69:632.4
Rhizoctonia solani Kühn e correlazioni tra
fattori parassitari e non parassitari nel
"Deperimento dei garofani" della Riviera
Ligure. (*R. solani* and the correlation of
parasitic and non-parasitic factors in withering
of carnations on the Riviera.) [English
summary 13 ll.]
Ann. Sper. agrar., 1948, 2 [n.s.]: 653-69,
bibl. 22, illus.
Trials show that the withering of carnations on the
Ligurian Riviera is due to associated infections of
Rhizoctonia solani and *Fusarium* spp., the first being
the more important. The fusaria may have a primary
or secondary action. All these parasites need the
presence of particular environmental factors to become
dangerous.
506. W.
Primula kewensis "Thurgold". (Thurgold,
a new *Primula kewensis* variety.)
Gärtnermeister, 1948, 51: 312.
Thurgold has been on the market in Switzerland for
two years and in this time has established its superiority
over the old *Primula kewensis*. The foliage of the new
variety is fresh and practically free from silvery powder;
its larger, intensely golden-yellow coloured flowers
have a fine scent.
507. McWHORTER, F. P., AND PRICE, W. C.
Enation disease of primula.
Plant Dis. Repr., 1948, 32: 345.
Plants of a large-flowered white variety (Pure White
Improved) of *Primula malacoides*, in a Pittsburg
conservatory, developed crenate veins which caused
the foliage to be ridged or fluted. The history of the
planting indicates that the disease was introduced in
the seed.
508. GILL, D. L.
Camellia wilt and root-rot.
Abstr. in *Phytopathology*, 1948, 38: 575-6.
Evidence from isolations and infection experiments
indicate that the disease is caused by *Phytophthora*
cinnamomi Rands. It is favoured by moist conditions.
509. TOMPKINS, C. M., AND HANSEN, H. N.
**Control [cyclamen petal spot] by reducing
humidity.**
Grower, 1948, 29: 977, reprinted from *Flor.*
Exch.
In the San Francisco Bay region of California the
evening fall in air temperature during the November
rains increases the relative humidity, favouring the
development of a petal spot of cyclamen, caused by
Botrytis cinerea. Control is effected by closing the top
ventilators and heating the glasshouse during the night.
510. MATVEEV, G. N.
**Caucasian irises and their value in ornamental
gardening.** [Russian.]
Priroda (Nature), 1948, No. 8, pp. 62-3,
bibl. 10.
An account of the Caucasian irises belonging to the
non-bulbous section *Oncocyclus* Baker, as being of
particular importance for the flower garden.
511. VAN GEEL, J. D. W., AND KOPPE, S.
Het trekken van tulpen in een geïsoleerde
schuur. (Forcing tulips in an insulated shed.)
[English summary 9 ll.]
Meded. Direct. Tuinb., 1948, 11: 558-65.
It is possible to force tulips in an insulated shed under
artificial light and obtain good plants. The advantages
are: (1) expenses for lighting are less than for fuel,
(2) results are more certain, (3) a special glasshouse is
not needed.
512. MAGIE, R. O.
Stemphylium leaf spot of gladiolus in Florida.
Plant Dis. Repr., 1948, 32: 344-5.
Stemphylium leaf spot causes annual loss to gladiolus
cut-flower growers in Florida. The disease may kill
the leaves before flowering, causing total loss. It
disappears in summer and autumn and reappears in
winter. Fungicides do not protect the leaves com-
pletely, but even the most susceptible varieties are
protected sufficiently by spraying with zinc ethylene
bis-dithiocarbamate materials, to keep the foliage green
until normal corm harvest time.
513. DIRECTIE VAN DE LANDBOUW.
De *Botrytis*-aantasting van Gladiolusknollen.
(The *Botrytis* infection of gladiolus corms.)
Meded. PZiZiektDienst, Wageningen 97, 1948,
pp. 11, illus.
An account of *Botrytis* rot of gladiolus corms caused by
B. gladiolorum. When lifted the corms should be
well dried, and then stored in a warm shed with good
ventilation and air circulation.
514. SMITH, F. F., AND BRIERLEY, P.
**Aphid transmission of lily viruses during
storage of the bulbs.**
Phytopathology, 1948, 38: 841-4.
Lily viruses may be transmitted during storage of the
bulbs by appropriate aphid vectors (*Myzus persicae*
and *Aphis gossypii*)—Plant Industry Station, Beltsville,
Maryland.

515. CLARK, L. H.
Botrytis polyblastis found in California.
Plant Dis. Repr., 1948, 32: 445-6, bibl. 6.
This fungus, first described by Dowson (*Trans. Brit. mycol. Soc.*, 1928, 13: 95-102) is here reported as causing a watery decay on King Alfred daffodil blossoms under humid conditions at the University of California, in 1947.
516. VITTORIA, A.
La natura morfologica del fiore di rosa, con accenno sulla possibilità di sviluppo nel campo applicativo agrario di alcune osservazioni rilevate. (The morphology of the rose flower, in its relation to applied agriculture*.)
Ann. Fac. Agrar. Portici., 1948, 16: 147-50.
The author discusses pseudanthus and caulomixa in relation to the ontogeny of the receptacle in the rose flower. In his own investigations on *Rosa wichuriana* he found that the receptacle arose as a single phyllodium to which others became united.
517. NEWTON, W., AND LINES, C. J.
The rooting of cypress and rose cuttings as influenced by arasan, fermate, and spergon, and each fungicide in combination with naphthalene acetic acid.
Sci. Agric., 1948, 28: 574-6, bibl. 5.
An experiment was carried out at the Dominion Laboratory of Plant Pathology, Saanichton, to determine whether treatment of cuttings with organic fungicides diminished loss or increased rooting. Cuttings of *Chamaecyparis lawsoniana*, var. *allumi* were given 8 different treatments: the bases were dipped in dusts of Fermate, Spergon or Arasan, alone and in combination with naphthaleneacetic acid; cuttings treated with naphthaleneacetic acid solution at 10 p.p.m. alone, and untreated cuttings were used as controls. All treatments diminished the loss, but the fungicides in combination with naphthaleneacetic acid were less effective than when used alone. Arasan did not increase rooting to the same extent as Fermate and Spergon. Cuttings of Hoosier Beauty rose were also treated, but the results were not significant.
518. GRAVES, G.
Some narrow upright trees.
Amer. Nurserym., 1948, 88: 10: 14, 47-50.
Notes on Lombardy poplar, the fastigate Norway maple (*Acer platanoides columnare*), *Acer rubrum columnare* (illustrated), *A. saccharum monumentale*, *Betula pendula fastigiata*, *Carpinus betulus fastigiata*, *Prunus serrulata lannesiana*, *Fagus sylvatica fastigiata*, *Quercus robur fastigiata* and others.
519. GRAVES, G.
Shrubs that renew each spring.
Amer. Nurserym., 1948, 88: 11: 12.
Notes on ornamental "die-back" shrubs that need to be cut to the ground every spring.
520. WYMAN, D.
The better hardy vines.
Amer. Nurserym., 1948, 88: 11: 7-9.
An account of ornamental climbing plants discussed
- under (1) twining, (2) clinging and (3) climbing with tendrils.
521. GALLE, F. C., AND NANK, E. E.
Leaf patterns of cotoneasters.
Amer. Nurserym., 1948, 88: 12: 10-11, 51-3.
Twenty-two species of cotoneaster are described and illustrated by leaf patterns.
522. DAVIS, S. H.
Organic fungicides in the control of certain shade and ornamental tree diseases.
Abstr. in *Phytopathology*, 1948, 38: 575.
Among other information it is stated that Bioquin 1 and Parzate gave excellent control of pear leaf blight (*Entomosporium maculatum*).
523. TOOLE, E. R., SNYDER, W. C., AND HEPTING, G. H.
A new *Fusarium* wilt of sumac.
Abstr. in *Phytopathology*, 1948, 38: 572.
A new vascular disease of staghorn sumac (*Rhus typhina*) has been shown to be caused by *Fusarium oxysporum*.
524. RODRIGUEZ, C.
Aspectos opticos en el desarrollo de semillas de *Gleditschia triacanthos* L. (Optical aspects in the development of the seeds of *Gleditschia*.) [English summary 7 ll.]
An. Inst. espan. Edaf. Ecol. Fisiol. veg., 1948, 7: 201-14, bibl. 16, illus.
A polariscopic study of the endospermic structure of the seeds of the honey locust.

Noted.

- 525.
- a BAKER, K. F.
The history, distribution, and nomenclature of the rose black-spot fungus.
Plant Dis. Repr., 1948, 32: 260-73, bibl. 114.
 - b BRIERLEY, P.
Two additional diseases of iris.
Abstr. in *Phytopathology*, 1948, 38: 574-5.
 - c BRIGGS, L. H., AND DACRE, J. C.
Chemistry of the *Coprosma* genus. Part I. The colouring matters from *C. australis*. Part II. The colouring matters from *C. areolata*.
J. chem. Soc. Lond., 1948, pp. 564-70.
 - d COSPER, L. C.
The response of *Dendrobium superbum* pseudobulbs to applications of indole acetic acid.
Reprinted from *Orchid Digest*, January 1941, 1 p. [received 1948].
 - e GOULD, C. J.
Treatments for gladiolus corm rots in Washington: progress report for 1947.
Plant Dis. Repr., 1948, 32: 257-9.
 - f WELSH, M. F.
Stunt-mottle virus disease of chrysanthemum [in British Columbia].
Sci. Agric., 1948, 28: 422, bibl. 1, illus., being *Contr. Dep. Agric. Canada Div. Bot. Plant Path. Sci. Serv.* 932.

* In relation rather to applied botany.—Ed.

SUB-TROPICAL CROPS.

General.

526. MAAN, W. J.
De tuinbouw in Marokko, Algerië en Tunis.
(Horticulture in Morocco, Algeria and Tunisia.)
Meded. Direct. Tuinb., 1948, 11: 573-627, illus.
A report on two visits to N. Africa in 1947, based on personal observations, information being obtained from horticultural authorities in Casablanca, Rabat, Oran, Algiers and Tunis, and from official statistics. Maps show the areas devoted to horticulture and notes are given on the geographical configuration and climate of the areas. The crops, yields and relevant information are dealt with in considerable detail for Morocco and Algeria, and illustrated with striking photographs.

527. CHOPRA, I. C., HANDA, K. L., AND KAPOOR, L. D.

A preliminary note on the essential oil bearing plants growing in Kashmir.

Indian J. agric. Sci., 1946-7, 16: 302-5; 17: 100-3, 389-92, bibl. 18.

A short report on preliminary investigations with brief notes on the occurrence, habitat, and uses of some 40 oil-bearing species together with, in most cases, tabulated information on their oils (yield, sp. gr. and refractive index).

Citrus.

(See also 10, 78, 93, 131, 141f, 250, 699, 702.)

528. CAMERON, A. E.
Cooamealla research [station for citrus fruit].
Citrus News, 1948, 24: 133, and *Agric. Gaz. N.S.W.*, 1948, 59: 463.
An announcement of a new station to be established by the State for citrus research at Cooamealla, New South Wales, to serve the Murray Valley.

529. SPOON, W.
Sinaasappelen uit Suriname. (Oranges from Surinam.) [English and French summaries, each ½ p.]
Ber. HandMus. kolon. Inst. Amst. 215, pp. 5, reprinted from *Voeding*, 1947, 7: 6: 245, bibl. 19.

Some information on the tropical oranges grown in Surinam, which have a firm, thin, light-coloured peel, tough membranes, and a large amount of very sweet juice. Production is increasing. Information is also given on experimental work in Surinam concerned with the manufacture of juices and syrups, and the extraction of essential oil from orange and lemon peel.

530. ANON.
Perennial orange.
Crown Colon., 1948, 18: 584.

A note on what is described as a recently discovered orange in Jamaica which yields an off-season summer crop, as well as the usual winter crop. It also holds its fruit in good condition from one winter season to another.

531. KEBBY, R. G.
Development of young citrus groves. Sound management in early years is vital to success.
Agric. Gaz. N.S.W., 1948, 59: 459-62, illus.

The author states that more than 30% of the young citrus plantings in New South Wales is being lost each year through disease and faulty management, and points out the measures to be adopted to obviate such losses, particularly with reference to the care necessary when lifting, despatching, and planting young trees, and in choosing rootstocks.

532. KARTER SINGH AND SHAM SINGH.
Citrus propagation studies. The influence of different methods of budding, after-treatments and rootstock vigour on bud-break, bud-take, histology of bud-union and size of budlings in case of sweet orange, mandarin and sour lime.
Indian J. agric. Sci., 1947, 17: 34-52, bibl. 27, illus.

A study of propagation methods with sweet orange, mandarin and sour lime in which two methods of budding, the "Indian" in which the wood in the bud shield is removed, and the "American" in which it is left untouched. Three after-treatments were compared. Other things being equal, it was possible to obtain bigger nursery trees of sweet orange and mandarin by the Indian method. The Indian method of budding also resulted in early and complete development of union between scion and rootstock. The practice of lopping the stock seedling top immediately after budding proved significantly superior to the other practices tried. The increase in the size of budlings was directly proportional to the vigour of stock seedlings used. There was, however, no influence of stock vigour on the period of bud-break and percentage take of buds. Spring conditions proved more favourable than summer in shortening the period to bud-break and increasing the take of buds. [From authors' summary.]

533. TAI, E. A.
Top-working citrus trees.
Ext. Circ. Jamaica Dep. Agric. 11, 1948, pp. 8, illus.

Instructions are given for frame-working, top-budding and top-grafting. The considerations governing top-working are briefly discussed. The subsequent care of top-worked trees is described.

534. SHAM SINGH AND NAGPAL, R. L.
Citrus rootstock trials in the Punjab. III. The influence of different rootstocks on the vigour and cropping of Marsh Seedless grapefruit.
Indian J. agric. Sci., 1947, 17: 117-27, bibl. 5.

A study, extending over 4 years, on the influence of 5 rootstocks, propagated from seed and cuttings, on tree vigour and cropping of the Marsh Seedless grapefruit. It is shown that for every 1% decrease in growth increment of grapefruit on Kharna Khatta, rough lemon, shaddock, sweet lime, and citron, there was a corresponding increase in fruit production of 23%, 22%, 19%, 9% and 13% respectively. A high negative

correlation existed between growth increment and cropping in each stock-scion combination tried. The trees on Kharna Khatta rootstock gave significantly higher yields for the four-year period than trees on the other rootstocks, and at little sacrifice in growth rate. From the standpoint of tree vigour and yield, Kharna Khatta gave the best result in the trial. [See also *H.A.*, 12: 1462 and 15: 248.]

535. INNES, R. F.

Marsh Seedless grapefruit.

J. Jamaica agric. Soc., 1947, 51: 207-11.

A report summarizing the results of field investigations from 1936 to 1946 into the effects of fertilizers on the growth, yield, and quality of Marsh Seedless grapefruit grown on the main citrus soils of Jamaica, and on the uptake of plant food elements by the fruit and leaves.—*Dep. Agric.*, Jamaica.

536. MARTIN, J. P.

Effect of fumigation, fertilization, and various other soil treatments on growth of orange seedlings in old citrus soils.

Soil Sci., 1948, 66: 273-88, bibl. 16, illus.

Sour and sweet orange seedlings grown in 3-gallon pots in the greenhouse made approximately 50% to 175% more growth in soil from areas which had never been cropped to citrus, than in soil from adjacent areas on which citrus trees had grown 40 to 70 years. Seedlings in old citrus soils did not respond to applications of P, K, Mg, Cu, B, Zn, or Mn. Fumigating the soil before planting usually controlled root rot and the citrus root nematode (*Tylenchulus semipenetrans* Cobb) and markedly stimulated growth of sour and sweet orange seedlings in old citrus soil. Non-citrus soils taken from areas under or near pepper trees gave poor growth of citrus seedlings, but fumigating the soil before planting resulted in growth as vigorous as that in most non-citrus soils.—*California Citrus Exp. Stat.*

537. VAN DER MERWE, A. J.

Absorption of phosphorus by citrus trees.

Effect of ammonium and nitrate nitrogen.

Fmg S. Afr., 1948, 23: 669-74, bibl. 4, illus.

Fruit and leaves of citrus trees receiving different fertilizer treatments were analysed for total nitrogen and phosphorus. The results confirm the findings of others that plants receiving N in ammonium form have a higher total N content than plants receiving it as nitrate. The total phosphorus content of the various parts of the fruit and leaves on plots treated with ammonium N, was lower than that of the plots treated with nitrate N. Notwithstanding the fact that phosphates were applied on a comparable basis, higher nitrogen-phosphorus ratios were determined in the juice, pulp, rind and leaves on plots treated with ammonium N than on those treated with nitrate N. Possible explanations are given for the positive and negative correlations as determined by various research workers. [From author's summary.] This article is a general summary of a treatise to be published later.—*Div. of Hort.*, Pretoria.

538. OPPENHEIMER, H. R.

Experiments with unfruitful "Clementine" mandarins in Palestine.

Bull. agric. Res. Stat., Rehovot, 48, 1948, pp. 63, bibl. 36, illus.

It has been found that the widespread unfruitfulness of the Clementine mandarin in Palestine is essentially produced by self-incompatibility. Productivity can be raised by top-working with useful pollinizers, e.g. mandarin varieties. The most suitable system of top-working seems to be re-budding (of every third tree in every third row) into young branches formed after heavy deheading. In order to raise the productivity in the first years after deheading and top-working, the main branches can be girdled to the wood, using a gardener's saw or knife, during the blossoming season, but bark strips removed should not be broader than 3 millimetres. This procedure, however, is not effective in all cases. Another measure recommended in the early years when insufficient pollen is available, is the introduction of flowering branches of mandarin or sour orange. These must be used in great number and have only a strictly local influence. Beehives should be introduced, if bees are absent. Spraying with 2,4-dichlorophenoxyacetic acid in 0.01% solution has been found of doubtful value for raising productivity, and such treatment cannot be recommended, since the fruit produced is of low quality and young leaves are deformed by hyponastic growth. Other artificial growth substances proved no better. Top-working with fruitful parthenocarpic Clementine strains is probably the best solution, but experimental evidence of its merits is still lacking. [From author's summary and conclusions.]

539. KEBBY, R. G., AND SKEPPER, A. H.

Citrus fruit quality. What are the main considerations?

Agric. Gaz. N.S.W., 1948, 59: 357-62, illus.

Soil, climate, bud selection, rootstocks, cultivation, cover crops, fertilizers, control of pests and diseases, and handling methods are discussed as important factors in citrus production and marketing. The necessity for careful picking, use of clean picking bags and field boxes, and efficient loading operations, is emphasized.

540. HALLIDAY, O. E., AND SPURLING, M. B.

Notes on sprinkler irrigation of an old citrus block on Murray sand.

J. Dep. Agric. S. Aust., 1948, 51: 594.

A preliminary note designed to indicate the importance of adjusting sprinkler application rates to soil infiltration capacity.

541. WAGER, V. A.

The distribution of the black spot fungus in South Africa.

Citrus Gr., 1948, No. 174, p. 4.

A note on a survey which showed that this citrus fungus [*Phoma citricarpa*] is widespread in S. Africa, but quiescent in some areas for reasons unknown.

542. WAGER, V. A.

The black spot disease of citrus.

Citrus Gr., 1948, No. 175, pp. 7-8.

This fungus, *Phoma citricarpa*, is known only from two other countries, Australia and Japan. At one time it appeared only in the more humid citrus areas of S. Africa but recent experience indicates that it may spread to all areas. Smooth lemons appear to be most susceptible. Rough lemons, grapefruit, mandarins and Valencia's are also affected. Navels, which ripen in

winter, are not affected unless they are left on the tree until warm weather returns. Suggested control measures include: early harvesting, first on the sunny side of the tree; the inducement of early maturity, by spraying with 1 lb. lead arsenate per 100 gal. water; spraying with bordeaux mixture (2 : 1 : 80) and copper oxychloride (50%) 1 lb. in 80 gal.

543. CASTELLANI, E.

La scabbia delle arance in Eritrea. (**Orange scab in Eritrea.**) [English summary 3 ll.] *Riv. Agric. sub trop.*, 1948, 42: 145-50, bibl. 16.

A description of the sweet orange fruit scab (*Elsinoë australis*) hitherto unknown in Eritrea but recently found there for the first time.

544. MALLAMAIRE, A.

La gommose parasitaire des agrumes. (**Gummosis of citrus.**) *Agron. trop.*, 1948, 3: 487-96, bibl. 45, illus.

An account of the condition known as gummosis, collar-rot, and mal di gomma caused by *Phytophthora citrophthora* and *P. parasitica*. The nature of the disease, its mode of development, the nature of injury caused and the susceptibility of various citrus species are briefly dealt with. Control measures are described at greater length.

545. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

Citrus aphids (*Toxoptera aurantii* and *Aphis* sp.). *Agric. Gaz. N.S.W.*, 1948, 59: 475-6.

Control of citrus aphids may be obtained by spraying with nicotine sulphate 1 pint, soft soap 5 lb. (or white oil emulsion $\frac{1}{2}$ gal.), water 100 gal. Formulae for combination sprays, to control diseases also, are given. Satisfactory control of these aphids can also be obtained by using DDT or HETP (hexaethyl tetraphosphate) preparations.

546. STOLBERG, F. J.

Scale control on citrus trees. Do oil-sprays affect yield and quality of fruit. *Fmg S. Afr.*, 1948, 23: 603-6.

From the results of experiments described it was found that oil-sprays definitely affect the yield and quality of Navel and Valencia oranges. Probably all oils of medium grade and lighter are safe for use in controlling scale on citrus provided they are applied fairly early in the season, i.e. December to March. Normally oil-sprays should not be applied before the young crop is at least of golf-ball size, as an earlier spray may cause burning and excessive drop of fruit and foliage. If a heavy-medium grade oil must be used, it should be at a concentration weaker than that for lighter oils and applied about the end of February. A light oil which is less likely to affect yield, total solids and fruit colour, may be applied as late as April, but preferably during the first half of the month.

547. PERRET, J. E.

Recherches sur les moyens à employer contre les escargots. (Investigations on the control of snails in citrus orchards of Morocco.) *Fruits et Prim.*, 1948, 18: 297-302, bibl. 1.

Short notes are given on the effect of numerous toxic substances tried. It is concluded that chemical contact poisons are unpromising for the destruction of snails, but useful and efficacious as repellants. Arsenical poisons and metaldehyde were outstanding in their effects.

548. HEAN, A. F.

A wilt disease of *Crotalaria juncea* Linn. (sunn hemp) found in South Africa. *Sci. Bull. S. Afr. Dep. Agric.* 255, 1947, pp. 15, bibl. 20.

Sunn hemp (a cover crop in citrus orchards) is affected by a wilt disease caused by *Fusarium moniliforme* var. *subglutinans* in several areas in South Africa. The symptoms, as in Trinidad and India, are rapid wilting and death of the plant and the production of pink spore masses on the lower part of the stem. Control measures suggested are crop rotation, the use of fungicidal dusts to protect the seedlings, and plant sanitation.

Other fruit crops.

549. ESTRADA, M.

Cultivo del datilero en la Argentina. (Growing date palms in Argentina.) *Rev. mens. B.A.P.*, 1948, 31: 364: 60-7.

An account of date-growing in the San Juan and La Rioja provinces of Argentina. At present there is only one commercial plantation in San Juan, although trees are to be found in gardens, parks, and public squares, where they are grown mostly as ornamentals. The possibility of extending the culture is discussed.

550. BLISS, D. E., AND LINDGREN, D. L.

The use of Thiomate "19" on dates and its effect on fruit spoilage. *Pap. Calif. Citrus Exp. Stat. Riverside* 572, 1947, pp. 12, bibl. 4, from *Rep. 24th A.R. Date Growers' Inst.*, Coachella.

Four varieties of dates in 10 test plots were treated with Thiomate "19", a mixture of 5% Fermate and sulphur. Fungus spoilage was reduced, the differences being statistically significant in 4 plots. Damage by nitidulid beetles was reduced. The response of the raisin moth, *Ephestia figulilella* Greg., and the Indian-meal moth, *Plodia interpunctella*, was doubtful. Infestations of the date mite, *Paratetranychus simplex* (Banks), disappeared after infested bunches were treated. Of three methods of date-fruit cleaning tested, that with moist rotating brushes was most, and that with Turkish towelling on a shaker table least effective.

551. CHAMPION, J.

Le feijoa, arbre fruitier peu connu. (The feijoa, a little-known fruit.) *Fruits d'outre-mer*, 1948, 3: 205-10, bibl. 12, illus.

An informative article on this subtropical fruit [*Feijoa sellowiana*] briefly covering: botanical affinities, origin, distribution, description of plant, its cultivation, propagation, flowering and fruiting, the value of its fruit (with chemical analysis), improvement, selection, and, finally, a list of named varieties.

552. ESTRADA, M.

La palta serrana. (The mountain avocado.)

Rev. mens. B.A.P., 1948, 31: 362: 26-8.

A continuation of the author's observations at the Yacanto experimental orchard on varieties of avocado introduced for testing. Varieties resistant to frost (-3° and -4° C.) are mentioned, and, of these, four are recommended for commercial plantations in the cold zones, viz. Northrop, Blackbird, Duke, and Ganter. Yields are discussed.

553. MORETTINI, A.

Aspetti biologici, culturali ed economici del diospiro o kaki. (Biological, cultural and economic aspects of the kaki in Italy.)

Riv. Fruttic., 1948, 10: 152-64.

The author gives a practical talk on the problem of the kaki, the climatic requirement of which would appear to correspond with those of the olive. The future of this fruit tree, which has been planted in Italy in ever-increasing numbers in the last 20 years, depends on the extent to which export, started just before the war to Germany, can be revived and increased.

554. CROCE, F. M.

Poda del kaki. (Pruning kaki.)

Rev. mens. B.A.P., 1948, 31: 368: 98, 101, 104.

The flowers, tree shape, and methods of pruning the kaki or Chinese date (*Diospyros kaki* L.) in Argentina are described. In this species the branches easily bend under the weight of the fruit and pruning is adopted to obviate, to some extent, this tendency. The various varieties have different habits of growth, e.g. erect or pendent, head effuse or compact, rounded or conical, and the method of pruning adopted should vary according to the natural habit of the variety. In general pruning is designed to produce one of two tree shapes, the open vase and the modified pyramid. The former is described in some detail.

555. CAPOOR, S. P., AND VARMA, P. M.

A mosaic disease of *Carica papaya* L. in the Bombay Province.

Curr. Sci., 1948, 17: 265-6, bibl. 9, illus.

A short note on symptoms, the nature of the virus, probable vectors, and possible means for limiting the spread of the disease. The virus seems to be distinct from virus diseases of pawpaw so far recorded.

556. MALAN, E. F.

Grenadilla production.

Fmg S. Afr., 1948, 23: 625-6.

The most popular variety of grenadilla in South Africa is Common Purple (*Passiflora edulis*), and its production has developed into a profitable industry. Only those areas with a relatively high humidity and more or less free from frost are suitable. Notes are given on the preparation of the soil, training and pruning. One grenadilla plant should yield an average of at least $1\frac{1}{2}$ pockets of fruit annually. The maximum yield is reached during the second year, after which the yields gradually decrease. Grenadillas suffer but little from insects or fungi, but recently a virus disease has been observed characterized by yellowing and curling of the leaves, and hard woody swellings, which later crack, on the fruit [cf. woodiness of passion fruit, H.A., 10: 101, 438; 11: 534; 15: 547; 17: 1102].

Tung.

557. D., H.

The cultivation of tung trees in the U.S.S.R.

Bull. imp. Inst. Lond., 1946, 46: 57-61, abstracted from Rev. int. Inst. Bot. appl., 1948, 28: 303-4, 32-48.

The history of the crop, the areas of cultivation, its ecology in sub-tropical Russia, the influences of day length, temperature, humidity, altitude, and soil are briefly dealt with, and information is given on planting material, cultivation, harvesting, yields, and oil quality. In spite of unfavourable ecological conditions the acclimatization of tung in Russia has been attained. New clones of *A. fordii*, which are particularly resistant to frost and which give high yields of oil of good quality, have been successfully grown.

558. WEBSTER, C. C.

Report on the preliminary reconnaissance of the possibility of cultivation of tung oil trees in the Eastern Districts of Southern Rhodesia.

Rhod. agric. J., 1948, 45: 319-29, bibl. 8.

Some useful notes on the requirements and cultivation of the tung tree (*Aleurites fordii* and *A. montana*) precede the main part of the report. Tung does not seem to have been given a fair trial in S. Rhodesia where almost all the plantations have been made with *A. fordii*, often planted under unsatisfactory conditions of soil and rainfall and given very little cultivation. On the other hand *A. montana* has shown promise in at least one area. The steps to be taken if it is desired to proceed with tung development are enumerated.

559. YIN, H. C., AND LIU, C. H.

Experiments on the rooting of tung tree cuttings.

Amer. J. Bot., 1948, 35: 540-2, bibl. 10.

The great variation in tung seedlings has made vegetative propagation important for large-scale plantations. The effect of growth substances and various physiological factors on the rooting of tung cuttings was investigated at Kunming, China. Untreated cuttings will root readily during the dormant season (December-February), but indoleacetic acid will increase the rate and degree of rooting during this period, and will extend the rooting season to 8 months of the year. Naphthaleneacetic acid is not recommended, and at 400 mg./litre is found toxic. Cuttings taken from the well-ripened, basal portion of shoots root better than those from higher up. There are indications that the age of the tree from which cuttings are taken has an important effect on their rooting capacity.

560. WEBSTER, C. C.

The effect of seed treatments, nursery technique and storage methods on the germination of tung seed.

E. Afr. agric. J., 1948, 14: 38-48, bibl. 8.

The experiments reported were undertaken to find means for accelerating the germination of tung seed (*Aleurites montana*) and of preserving viability during seed storage. Some of the experiments were repeated with *A. fordii*. None of the seed treatments tested effected improvement in germination of seed stored for several months, but grinding or cracking the shell of fresh seed accelerated germination and usually

improved final germination. Neither method is, however, practical under estate conditions. Shading and mulching of nursery beds is undesirable. Seed position is unimportant, except when the hilum end points down, in which case speed of germination and final percentage emergence is reduced. Sowing with 1-in. of soil above the seed was better than with 2 in. In the cool season, watering on alternate days at the rate of 2 gallons per sq. yd. was superior to daily watering at the same rate, but in the hot season the reverse was true. Tests indicate that the best germination is obtained if the seed is collected and sown when the fruits are just fully ripe. Seed mixed with moist sand and stored in boxes in a cool building will keep its viability for periods of up to 6½ months and on planting will germinate rapidly. Plants raised from such seed are ready for budding one year later and storage by this method therefore enables the time in the nursery to be shortened by 5 to 6 months and eliminates most of the expense of the watering necessary in the dry season.—Dep. Agric. Nyasaland.

561. WEBSTER, C. C.

A note on the cultivation and manuring of tung plantations (*A. montana*) [in Nyasaland].
Nyasaland agric. quart. J., 1948, 7: 58-64.

Although knowledge concerning the cultivation and manuring of tung plantations in Nyasaland is as yet scanty, there is evidence to show that reasonably good cultivation is desirable in the early years and that care must be taken to ensure that adequate nitrogen is available. Attempts to meet these requirements are at present handicapped by lack of labour and shortage of nitrogenous fertilizers. Possible ways of surmounting these difficulties are discussed.

562. WEBSTER, C. C.

The Vipya tung development scheme [Nyasaland]: a progress report.
Nyasaland agric. quart. J., 1948, 7: 30-5.

The programme of investigation and initial development involves the planting of approximately 500 acres of tung in the Vipya Mountains which will serve as a nucleus for rapid and extensive developments should the experimental areas prove successful. An account is given of preparatory work, also of nurseries and plantations.—Dep. Agric., Nyasaland.

563. DEMAREE, J. B., AND LARGE, J. R.

Leaf variegation in tung.
Phytopathology, 1948, 38: 658-60, illus.

Leaf variegation in tung (*Aleurites fordii* Hemsl.) is very infrequent and economically unimportant. There is evidence that an inheritance factor is involved, rather than the presence of a virus.

Sweet potatoes.

(See also 351.)

564. EDMOND, J. B., AND OTHERS.

Cooperative studies of sweetpotato-plant production.
Circ. U.S. Dep. Agric. 787, 1948, pp. 17, bibl. 7.

In trials carried out in Mississippi and South Carolina for 4 and 3 years respectively the sweet potato variety Porto Rico was found to have a significantly greater

plant producing capacity than Triumph, irrespective of nitrogen level and time of harvesting. The tabulated data show further that (1) roots harvested at the very beginning of the harvesting season give the best yield of plants; (2) no advantage accrues from curing before storing where natural temperatures at harvest time reach 80° F. or more; (3) the plant-producing capacity of roots is unfavourably affected if the temperature drops below 50° F. at any time during storage. It is recommended that nitrogen manuring of bedding stock should be kept as low as is consistent with good yields. The saving of seed stock by proper handling of the roots was considerable.

565. DAINES, R. H.

Scurf, black rot, and stem rot of sweet potatoes.

Circ. N. J. agric. Exp. Stat. 514, 1948, pp. 8.

These three diseases of sweet potato are described and the first two illustrated. Preparations that have been tried for seed treatment and for sprout treatment are mentioned. Semesan Bel (an organic mercury compound) is good for both treatments but may, under some conditions, injure young plants.

566. COOK, H. T.

Control of sweet potato scurf by vine cuttings.

Abstr. in *Phytopathology*, 1948, 38: 568.

Results of experiments indicate that scurf-infected sprouts were the chief source of scurf and that scurf-free potatoes may be obtained by planting vine cuttings (sprouts cut about 1 in. above the sand).

567. ARMSTRONG, G. M., AND ARMSTRONG, J. K.

Nonsusceptible hosts as carriers of wilt fusaria.

Phytopathology, 1948, 38: 808-25, bibl. 13.

Healthy sweet-potato roots were found to carry internally fusaria which were not the sweet-potato-wilt fungus, and plants from such roots also contained fusaria which apparently came from the parent potato.—South Carolina Agricultural Experiment Station.

Noted.

568.

a GOIDANICH, G., RUGGIERI, G., AND GAGNOTTO, A.

Presenza di una terza forma di moltiplicazione agamica in *Deuterophoma tracheiphila* Petri. (A third form of agamic multiplication in *D. tracheiphila* [agent of mal secco].) [English summary 7 ll.]

Ann. Sper. agrar., 1948, 2 [n.s.]: 671-5, bibl. 2, illus.

b KHAN, I. U.

A technique for growing citrus seedlings under aseptic conditions of culture.

Phytopathology, 1948, 38: 756-7.

In test-tubes for damping-off studies.

c KIMBROUGH, W. D.

Yields of three industrial varieties of sweet potatoes.

Proc. Amer. Soc. hort. Sci., 1948, 51: 390-2, bibl. 3.

Triumph, Pelican Processor, and White Star.
—Baton Rouge, La.

TROPICAL CROPS.

General.

(See also 685, 720, 723.)

569. FERNIE, L. M.
The Amani Plantations [Tanganyika Territory].
E. Afr. agric. J., 1948, 14: 86-93, bibl. 3.
An account of some of the more interesting horticultural features to be seen at the East African Agricultural Research Institute, Amani, Tanganyika Territory, situated on the eastern slopes of the East Usambara Mountains at approximately 5° south latitude and 38-38° east longitude. These plantations, begun by the Germans in 1902 and continued under British administration after the 1914-18 war, extend from about 1,300 ft. to 3,700 ft. above sea level. They contain a wealth of economic and ornamental plants, mostly introduced species, the more interesting of which are mentioned in this article.
570. WISAKSANO WIRJODIHARDJO, M.
Work of the research stations in the Dutch East Indies. [Speech without title, in Dutch.]
Chron. Nat., 1948, 140: 258-62.
A review, by the head of the Department of Agriculture and Fisheries in the Dutch East Indies, of the work of the agricultural research stations there during the last 50 years. The extent to which plant breeding has helped to increase rubber production is shown by the fact that in 1910 a yield of 400-500 kg. per ha. was to be expected; now a good clonal plantation can produce 2,000 kg. per ha. The breeding of Schwarz 21, the tobacco variety resistant to slime disease, derris control of the *Artona* caterpillar, and the practice of green manuring for maintaining soil fertility, are among the developments that have had far-reaching practical results.
571. VAN WEEL, P. B.
Some notes on the African Giant Snail, *Achatina fulica* Fer. I. On its spread in the Asiatic Tropics. II. On its economical significance.
Chron. Nat., 1948, 104: 241-3, 278-80, bibl. 25.
An account, with some dates, of the spread of this garden and field pest to various countries in, and bordering on, the Indian Ocean. A rapid spread of the snail over large areas by mechanical means is possible. It is suggested that strict measures be taken to prevent the introduction, and export, of snails and that preventive measures be intensified in areas bordering on newly-infested ones. Effective means for exterminating this snail are lacking at present. Economics: On the debit side a list of economic plants is given showing the reported damage done to each [but omitting sugar-cane, which may be seriously damaged]. On the credit side it is stated that the snail can be used as poultry food, as a supplement in human diet, and as a fertilizer.
572. CONFORTI, E.
La consociatione delle piante coltivate nei paesi tropicali. (Interculture in the tropics.) [English summary 6 ll.]
Riv. Agric. subtrop., 1948, 42: 218-29, bibl. 20.

A discussion of the advantages and disadvantages of interculture with many notable examples of its results in practice with particular tropical crops. A distinction is made between what the author describes as indispensable interculture, when one plant is grown for the definite advantage of another—perhaps to afford it shade—and interculture adopted for economic reasons, i.e. to get the maximum return from a piece of land when both crops suffer somewhat from the association. Interculture is particularly to be avoided of plants which suffer from the same pests or diseases, when each acts as a host to the other's enemies.

573. STEYAERT, R. L.
La situation phytosanitaire de l'Afrique centrale. (The phytosanitary situation in central Africa.)
Parasitica, 1948, 4: 109-30.
A general review of pathological problems connected with the crops cultivated in central Africa, with mention of diseases caused by fungi, stigmatomycoses, insects and viruses. Most of the diseases are given merely passing reference, but for a few the comments are rather more extended, e.g. tracheomycosis (*Fusarium* spp. and *Verticillium dahliae*), potato blight (*Phytophthora infestans*), and "swollen shoot" of cocoa.
574. HOWES, F. N.
Vegetable sources of edible oils.
Research, 1948, 1: 678-84, bibl. 12, illus.
A popular article which includes notes on: the coconut palm; the African oil palm; some S. American palms, including *Attalea speciosa*, *A. cohune*, and *Elaeis melanococca*; the olive; the Shea nut, *Butyrospermum parkii*; Illipe nuts; and *Telfairea* spp. Passing reference is made to many other oil nuts.
575. SMITH, J. H.
Shy bearing due to coreid bugs.
J. Aust. Inst. agric. Sci., 1948, 14: 150.
It is known that shy bearing of coconuts in certain Pacific islands and of the Queensland nut in Australia can be caused by *Amblypelta* spp. A guess is hazarded that shy bearing in other tree crops will be traced to the Coreid bug, or related pests.
- Sugar cane.*
(See also 352, 353, 716.)
576. ARCENEAUX, G., HEBERT, L. P., AND MAYEUX, L. C., Jr.
Agronomic progress with sugar cane in Louisiana.
Sugar J., 1947, 10: 7: 9-10, bibl. 2.
The progress refers to: improved sugar-cane varieties; the use of 2,4-D against alligator weed; the control of Johnson grass by bare fallowing and the flaming of ditch-banks; and earlier planting, so that canes are established before winter.
577. CLAYTON, J. L.
Sugar-cane agriculture in Hawaii.
Cane Gr. quart. Bull., 1948, 12: 59-80, illus.
A report on a recent visit. A description of the Hawaiian Islands, their sugar-cane areas, and the organization of the sugar industry is followed by

sections on labour, economics, cropping, and harvesting. Six pages are devoted to weed control with 2,4-D. The estimated average yield of cane in the islands for 1947 was 61.5 tons, or 7.15 tons of sugar, per acre. The best irrigated plantations produce nearly 100 tons of cane, or over 10 tons of sugar, per acre.

578. BEHNE, E. R.

Approved varieties of sugar cane for planting in 1948.

Aust. Sugar J., 1948, 39: 512-14.

A list compiled and issued by the Director of the Queensland Bureau of Sugar Experiment Stations; a separate list being given for each of 34 areas.

579. BUREAU OF SUGAR EXPERIMENT STATIONS, QUEENSLAND.

Forecast of approved [sugar-cane] varieties for 1949.

Cane Gr. quart. Bull., 1948, 12: 80.

A list of proposed changes in the approved variety list for 1949.

580. RIOLLANO, A., AND JULIA, F. J.

Three promising new sugarcane varieties for Puerto Rico.

Sugar J., 1948, 10: 9: 46-8.

The three varieties are P.R.902, P.R.905, and M.336. The main characteristics of each are given. All are seedlings of P.O.J.2878 and M.28. A chart shows the parentage of Puerto Rico hybrid canes. [Note: The prefix M used for certain Puerto Rico cane varieties refers to Mayaguez (Federal Station) and should not be confused with the M prefix used since 1917 for sugar-cane varieties bred in Mauritius.—Ed.]

581. GONZALEZ RIOS, P.

The development of new sugarcane varieties.

Sugar J., 1948, 11: 1: 3-4, 10-12, bibl. 3.

A paper giving a brief history of sugar-cane breeding in Puerto Rico followed by an account of the methods now used in breeding and a statement of the aims and objects pursued. A chart shows the parentage of Puerto Rico hybrid canes of the P.R. and M series.—Agric. Exp. Stat., Rio Piedras, P. Rico.

582. I.A.R.I.

The 1947 batch of new Co. canes.

Indian Fmg., 1947, 8: 250.

The 1947 batch of Co. canes consisted of fifteen canes, Co. 645 to Co. 659 (inclusive). Two of these, Co. 651 and Co. 655, fall in the Co. 419 class. Co. 652 is thick and somewhat soft in rind and, though only moderate in sucrose, is of possible value as a chewing cane. Co. 649 is the first cane of Uba Marot parentage to be released from Coimbatore. It is vigorous but is only moderate in sucrose. Co. 646 contains in its composition the parents of Narenga. Among rich, early types Co. 659 and Co. 657 deserve mention. The parentage and some characteristics of these fifteen canes are given.

583. DUTT, N. L., AND OTHERS.

Uniform glazed pans for raising sugarcane seedlings.

Curr. Sci., 1948, 17: 270-1, illus.

A note on the better health, vigour, distribution, and

uniformity in growth observed in sugar-cane seedlings raised in shallow, glazed, earthenware pots as compared with those raised in similar, but unglazed, pots. An explanation is offered.

584. STEVENS, F. D.

Experience with flooded cane under Everglades conditions.

Sugar J., 1948, 11: 3: 3-4.

Two cases of flooding in Florida are quoted from which it is concluded that cane will survive considerable periods of flooding so long as the growing tip is not submerged. It is suggested that controlled flooding might be to the grower's advantage as the early generation of cane borers would probably be destroyed [cf. flood-fallowing in British Guiana.—Ed.].

585. KHANNA, K. L., AND RAHEJA, P. C.

Some observations on the water relations of sugar cane plant in North Bihar.

Indian J. agric. Sci., 1947, 17: 353-69, bibl. 25.

An account of a preliminary attempt to elucidate the relationship of the sugar-cane to soil moisture under the sub-tropical, unirrigated, conditions of N. Bihar.—Dep. Agric., Bihar.

586. KHANNA, K. L., AND RAHEJA, P. C.

The relative efficiency of water requirements in relation to manurial treatments [with sugar-cane].

Indian J. agric. Sci., 1947, 17: 371-6, bibl. 19.

A short review of the subject is followed by an account of two trials in which sugar-cane was grown in containers, or "auto-irrigators". Amongst other things it was found that the application of the whole of the manure, whether organic or inorganic, at the time of planting resulted in more economical use of water than application half at planting and half later at earthing up.

587. SAVESON, I. L.

Drainage research for sugarcane land in Southern Louisiana.

Sugar J., 1947, 10: 7: 7-8, 15, illus.

A description of a project the main purpose of which is to develop new methods and machinery to effect and maintain drainage improvements on sugar-cane land. The testing and adapting of present methods and available machinery are also included. Three phases of drainage work have been given consideration to date: land grading for drainage, mole drainage, and lateral ditch construction and maintenance. These phases are discussed.—U.S.D.A., Soil Conservation Research.

588. YARBROUGH, M. V.

Power driven plant cane hoe development.

Sugar J., 1947, 10: 5: 8-11, illus.

An account of the development in the U.S.A. of a tractor-drawn, power-driven, spinner type hoe capable of weeding young plant [or virgin] sugar-cane at the rate of 1½-2 acres per hour. It requires an operator, in addition to the tractor driver.

589. VAN DILLEWIJN, C.

The germination of sugarcane.

Sugar J., 1948, 10: 12: 3-6, 20-3, bibl. 44, illus.

A review of the known factors influencing the sprouting of sugar-cane setts or cuttings. The following aids to sprouting are mentioned: the use of cuttings derived from well-nourished canes; the soaking of setts in water, saturated lime-water, or certain chemical solutions before planting; limiting the length of cuttings to three buds, and planting them with the buds to the side; removal of the leaf-sheaths from cuttings before planting.

590. ANON.

The arrowing of cane [in Queensland].

Aust. Sugar J., 1947, 39: 184-5.

Some notes on supposed causes of flowering in the sugar-cane, about which the author states there appears to be no clear understanding.

591. M.-L., H.

The deterioration of cane after burning.

Int. Sugar J., 1948, 50: 63-4, bibl. 5.

A brief review of certain investigations into the subject. It is concluded that there is a very appreciable loss through deterioration after burning, the avoidance of which would justify considerable capital expenditure. An organization which would minimize the delay between harvesting and milling would pay a handsome dividend.

592. HUGHES, C. G.

Treatment with fungicides as a help to better strikes [of sugar-cane setts].

Cane Gr. quart. Bull., 1948, 12: 54-8, illus.

Experimental work on sett treatment in various countries is reviewed and its practical application in Queensland discussed. It is recommended that when planting has to be done in excessively dry or wet conditions, or when temperatures are low, setts should be dipped in a mercurial, 1% strength in the case of Agrosan and Ceresan, or 0.5% of Aretan. Field apparatus for treating setts in bulk is described and illustrated.

593. RAO, J. T.

Leaf mid-rib structure of sugarcane as correlated with resistance to the top-borer (*Scirpophaga nivella* F.).

Indian J. agric. Sci., 1947, 17: 203-10, bibl. 6, illus.

This study included different species of *Saccharum* and their hybrids. "A fairly close correlation" was found between the amount of lignification in the mid-rib and the degree of resistance of the variety to top-borer. Thick cane varieties generally have a "good amount of lignification in their mid-ribs" while thin varieties show poor lignification. As the former character is inherited it is suggested that it might be possible to breed cane varieties resistant to top-borer.—Sugarcane Res. Stat., Coimbatore.

594. PEMBERTON, C. E.

The control of the grass armyworm, *Laphygma eximpta* (Walker), in Hawaii by parasites.

Hawaii Plant. Rec., 1948, 52: 181-200, illus.

A paper emphasizing the practical importance of the

natural enemies (15 spp.) of the armyworm which attacks sugar-cane in Hawaii. A brief history of each parasite and predator is given and its habits are discussed. The risk of destroying these beneficial insects by insecticides used against the armyworm is stressed.

Tea.

(See also 713.)

595. VERHAAR, G., AND DEYS, W. B.

Theezaadolie II. (Tea seed oil II.)* [English summary ½ p.]

Arch. Theecult. Ned.-Ind., 1948, 16: 37-52, bibl. 8.

Seed of *Thea sinensis* var. *assamica* was examined chemically and physically. The oil was extracted by: benzene at room temperature, boiling benzene, and by pressing. Several chemical and physical characteristics of the oil were determined which show it to have a close similarity to olive oil.

596. SPOON, W.

Duurzaamheid van thee. (Storing tea for long periods.) [English and French summaries ½ p. each.]

Ber HandMus. kolon. Inst. Amst. 214, reprinted from *Voeding*, 1946, 7: 4: 152-6, bibl. 3 [received 1948].

A case is quoted in which tea stored in the tropics for a number of years remained in "fairly good" condition—a tribute to the pre-war packing methods used on tea estates in Java.

Coffee.

597. KLINKOWSKI, M.

Die Wanderungswege des Kaffeebaumes. Ein Beitrag zur Wanderungsgeschichte kolonialer Nutzpflanzen. (The migration of the coffee tree. A contribution to the migration history of colonial plants.)

Züchter, 1947, 17/18: 247-55, bibl. 11 [received 1949].

The coffee tree acquired its great importance only after it had been cultivated in areas other than its original home, northern tropical Africa. Other cultivated plants, such as rye and potato, had evolved similarly. The migration of the coffee tree and the introduction of coffee as a beverage into various countries is traced.

598. VENKATARAYAN, S. V.

The orientation of the seeds in species of *Coffea* Linn. in Mysore.

Indian J. agric. Sci., 1947, 17: 289-90, bibl. 9, illus.

The orientation of the seeds of *Coffea arabica*, *C. liberica* and *C. laurentii* (*C. robusta*) is described. If their fruits are cut transversely, and the basal half examined, the appearance of the cleft in the endosperm, the funicles, and placenta are characteristic. The differences in appearance are described, illustrated and discussed.

* For I see *H.A.*, 18: 3082.

5.9. AAGAARD, B. M.

Experiments with D.D.T. bands to control mealy-bug and *Antestia* [of coffee].

Mon. Bull. Coffee Bd Kenya, 1948, 13: 122-3, illus.

Various types of home-made DDT-impregnated bands tried on a Kenya coffee plantation against mealy-bug are described. Following the use of these bands against mealy-bugs, a large area of coffee banded for over a year but not dusted with pyrethrum was found to be practically free of *Antestia*. Further trials gave similar results. Although the trials conducted so far are not conclusive, it is suggested that DDT banding offers a method of destroying *Antestia* without upsetting the biological balance of insect life in coffee plantations. It is claimed that further experiments are warranted.

Cacao.

(See also 722.)

600. VOELCKER, O. J.

West African Cacao Research Institute field experiments.

Emp. J. exp. Agric., 1948, 16: 241-8, bibl. 5, illus.

A description of certain aspects of the research programme as they concern field experiments.—W. African Cacao Res. Inst., Tafo, Gold Coast.

601. BOWMAN, G. F.

Cacao center at Turrialba [Costa Rica].

Foreign Agric., 1948, 12: 264-7, illus.

A note on the origin and activities of the Inter-American Cacao Centre, part of the Inter-American Institute of Agricultural Sciences, opened in 1948 to investigate cultural, disease, and processing problems common to all the interested member countries. Particular attention is being given to investigations into the control of *Phytophthora palmivora*, causing cacao pod rot, the major cacao disease of Costa Rica, where witches'-broom, *Monilia* pod rot, and swollen shoot are not found.

602. MCINTOSH, A. E. S.

Implementation of the recommendations of the Cheesman report.*

Malay. agric. J., 1948, 104: 247-50.

Extracts from a memorandum detailing the steps which are being taken to implement the recommendations in the report on cacao possibilities in the Far East as they concern Malaya.

603. OSTENDORF, F. W.

Cacao-plantmateriaal. 1. Het oculeeren. 2. Het stekken. 3. Een plantmateriaal-advies voor Java. (Planting material of cacao. 1. Budding. 2. Cuttings. 3. What to plant in Java.)

Bergcultures, 1948, 17: 2-5, 28-9, 31, 47, 49, 51, 53, bibl. 13, 8 and 10.

The history and technique of budding are given in the first article. In the second the rooting of semi-hardwood and single internode cuttings is described, and the relative merits of cuttings and budded plants are discussed. In the third are discussed some yield trials

in Java, and three tested clones are described. DR1 is self-sterile and heterozygous for cotyledon colour; DR2 is self-fertile and homozygous for white cotyledons; DR38 is less vigorous, susceptible to *Helopeltis*, self-fertile, homozygous for white cotyledons, with pod and seed reminiscent of criollo. Suitable rootstocks are discussed.

604. SQUIRE, F. A.

Entomological aspects of "swollen shoot" of cacao.

Nature, 1948, 162: 743.

It is suggested that it might be well worth while studying biological control methods of "swollen shoot" vectors.

Rubber.

605. VAN DER GIESSEN, AND OSTENDORF, F. W.

The oldest hevea trees in Java.

Chron. Nat., 1948, 104: 197-200, bibl. 15.

A somewhat detailed history of hevea rubber in Java, from which it is argued that the rubber industry of the Dutch East Indies owes its origin, as does that of Malaya, "nearly exclusively" to the Wickham expedition to the Amazon valley in 1876.

606. VAN AGGELEN-BOT, G. M.

Het verloop van de melksapvaten in de bladbasis van *Hevea brasiliensis*. (The course of the latex vessels in the leaf base of *Hevea brasiliensis*.) [English summary $\frac{1}{2}$ p.]

Arch. Rubbercult. Ned.-Ind., 1948, 26: 115-20, bibl. 4, illus.

Anatomical investigations have refuted Bobilioff's opinion that in mature leaves no connexion exists between the latex vessels in the leaf stalk and those in the stem or branch. In the petiole, the latex vessels form a network running between sieve tubes and phloem parenchyma cells. In the pulvinus, at about 5 mm. from the base, they begin to branch off in the direction of the cortex; the number of branches increases towards the base of the leaf. In the region where the conducting tissue of the leaf stalk joins the main vascular bundles of the stem, the latex vessels appear as a fine network scattered between the cells of the pith, the cortex and the tissue connecting stem and petiole. In the stem again they are mainly limited to the phloem. In young leaves relatively more latex vessels are found at the base of the stalk than in older leaves and the connection with those of the stem is seen more distinctly. However, even in mature leaves there is no complete interruption. [Author's summary.]

607. DE HAAN, J., AND VAN AGGELEN-BOT, G. M.

De vorming van rubber bij *Hevea brasiliensis*. (The formation of rubber in *Hevea brasiliensis*.) [English summary 2½ pp.]

Arch. Rubbercult. Ned.-Ind., 1948, 26: 121-80, bibl. 26, illus.

Data from the literature on the subject are first discussed. These indicate that the formation of rubber in *Hevea* is not a reaction to wound stimulus, but that it is closely connected with life processes within the tree. A distinction should be made between the primary rubber formation occurring during development

* See H.A., 18: 2971.

of new tissues, and the secondary rubber formation taking place in the bark on tapping. Investigations on rubber formation are then recorded. In young seedlings, the quantity of rubber deposited in the newly-formed tissues is shown to be proportional to the amount of dry matter. This result points to the probability that rubber is formed as a by-product of growth metabolism. To investigate whether rubber deposited in the tissues may be used again in metabolic processes, young seedlings were severed from their seeds and grown in the dark. Since assimilation was impossible while respiration went on unchecked, these plants lost 20% of their dry weight and 50% of their carbohydrates, but the quantity of rubber per plant remained constant. These observations confirm the results of previous investigators who likewise reached the conclusion that rubber cannot be utilized as a food reserve by the *Hevea* plant. Analyses of *Hevea* leaves in different stages of development led to the conclusion that in the complete cyclus of leaf whorl formation three distinct phases occur: (1) during the growth of the leaves the increase in quantity of rubber deposited in the tissues is proportional to the increment in dry weight; (2) when the leaves have attained their full size rubber formation is stopped though the dry weight per leaf continues to rise by formation of assimilates; (3) when the terminal bud begins to flush, and food reserves in the full-grown leaves of the last whorl are mobilized, the amount of rubber per leaf is seen to increase again. This rise is followed by a decrease, to which a new increase succeeds. Further observations are in accordance with the hypothesis that the rubber in the tree cannot be utilized as a food reserve. The last two chapters of the paper discuss the possibility of predicting the yield capacity of a tree from the rubber content of its bark and leaves. Results are quoted which indicate that a high rubber content in the bark is a necessary condition for a tree to be of a high yielding type. This character should therefore become one of the principal objectives of *Hevea* selection. Since a high rubber content in the bark appears closely correlated with a high rubber content in the leaves, the latter character may be used as an indicator of the rubber content of the bark, thus avoiding the damage that results from sampling the bark. [From English summary.]

608. V. D. BIE, G. J.
Nieuwe aanwinsten van resistente rubber-varieteiten. (Acquisition of resistant rubber varieties by S. America.)
Abstract from *Agricoltura tropical* Vol. 2, No. 4, 1946, in *Chron. Nat.*, 1948, 104: 29.

A preliminary trial of *Hevea brasiliensis subconcolor*, said to be resistant to the fungus *Dothidella ulei*, was held in Turbo in 1943. Following this trial 3½ tons of seed was sent to Colombia, Brazil and Peru, in 1946.

609. LORENZ, R. C.
Nieuwe bladziekte van Hevea. (New leaf disease of hevea in Peru.)
Abstracted from *Amer. J. For.*, January 1948, pp. 27-30, in *Chron. Nat.*, 1948, 104: 156.

A new leaf disease of hevea discovered by R. Russel in 1942, has been provisionally attributed to a *Pellicularia* fungus, possibly *P. filamentosa*. Spots, 2-10

mm. in diameter, appear on the leaves, and the basidiospores emerge on the under side of the leaf. The disease has been reported from various parts of Chile. *H. brasiliensis* and *H. guianensis* var. *lutea* are susceptible, but some resistant clones have already been found. Copper sprays have proved effective in control.

610. V. D. BIE, G. J., AND VAN GILS, G. E.
Bevolkingsrubber uit Borneo. (Native methods of rubber manufacture in Borneo.)
Chron. Nat., 1948, 104: 74-6.

Native methods of manufacturing smoked sheets differ considerably in West and South Borneo. In the south they are comparable with those used on European estates, whereas in the West methods are primitive, and sheets are dried in the open air and sun. The effect of various factors (sunlight, maturation and storage) on the quality of the sheets is discussed. A comparative qualitative examination proved, contrary to expectation, that the primitive sheets of West Borneo were in some ways better than those treated in the European way in the South. There is a discussion on the possibility of shortening the drying and re-milling process of "bark crêpe", but no conclusion is reached.

Palms.

611. HENRY, P.
Les facteurs de la pollinisation chez le palmier à huile. (Factors in the pollination of the oil palm.)
Oléagineux, 1948, 3: 587-9, illus.

Mainly on the relative importance of wind and insects in the pollination of the oil palm—a question which is left unsettled. The importance of weevils as pollen carriers is discussed and six *Prosoestus* species named. Bags for isolating female inflorescences are described made from double-sewn sail-cloth, which can be treated with paraffin wax, latex or drying-oil; but such treatment reduces the fruit set. Before fertilizing the bagged flowers, the pollen to be used should be tested *in vitro*, using a 5-6% solution of sucrose in which the pollen is cultured at 37° C. and examined after 6 and 12 hours.

612. HENRY, P.
Un mutant chez le palmier à huile: l'élaeis vivipare. (A mutation of the oil palm: the viviparous *Elaeis*.)
Oléagineux, 1948, 3: 546, illus.

A short note on a mutation studied at the I.R.H.O. Station, La Mé [French West Africa] in which the axillary buds produce shoots instead of inflorescences. These offshoots can be removed and propagated—the first time that vegetative reproduction of the oil palm has been achieved. This mutation bears male inflorescences from time to time. Pollen from these has been used in crosses with other palms. Cytological studies have shown that the chromosome number of the mutant is the same as in normal oil palms. A description of the mutant is promised in the *Revue Internationale de Botanique Appliquée*.

613. WARDLAW, C. W.
Vascular wilt disease of oil palms in Nigeria.
Nature, 1948, 162: 850-1, bibl. 2.

The presence of vascular wilt disease in Nigeria caused

by *Fusarium oxysporum* is confirmed, the disease in some plantations examined being severe. The breeding of resistant varieties may be shortened by the discovery that an infection can be diagnosed in 18-24-month-old seedlings. A leaf disease known as patch yellow which occurs in Nigeria and the Belgian Congo has also an associated strain of *F. oxysporum*, but it differs from that isolated from necrosed vascular strands. It is observed that, broadly speaking, the major oil palm plantation problems are common to the whole oil palm region of West and Central Africa. [See also *H.A.*, 17: 1001.]

614. ANON.

Cultivation of arecanuts [*Areca catechu*].

Indian Fmg., 1948, 9: 209-12, reprinted from *East. Econ.*, 16 January, 1948.

Includes notes on planting, manuring, harvesting, and marketing, with some production and consumption figures for India.

615. DAJI, J. A.

Manganese toxicity as a probable cause of the "Band" disease of areca palm.

Curr. Sci., 1948, 17: 259-60, bibl. 1.

Figures are quoted showing the manganese content of the soil and the manganese and iron content of leaves from healthy and diseased areca palms. It is suggested that the abnormally high absorption of these elements is likely to prove toxic and that the toxicity so produced is the cause of the disease.

616. ANON.

The coconut industry in India.

Indian Fmg., 1948, 9: 165-8, reprinted from *Indian Coconut J.*, October-December 1947.

Includes notes on central and regional research stations, the distribution of "quality" seedlings, and technological research.

617. RAGHAVAN, T. S.

Further notes on seedling selection [of coconuts].

Leaf. Coconut Res. Scheme (Ceylon) 14, 1948, pp. 4.

Deals briefly with the procedure to be followed by growers in selecting nuts and seedlings. The need for seedling selection is stressed.

618. CHILD, R.

Coconut shells.

Trop. Agriculturist, 1948, 104: 38-40, reprinted from *Mag. King's Coll. (Lond.) Chem. Soc.*

Briefly covers the estimated annual production of coconut shells in Ceylon, their composition, and uses (charcoal, distillation products and other applications). A table shows the approximate quantities of primary products obtainable from the distillation of 1 ton of shells. A recent development is the use of finely ground coconut shell in plastics.—*Coconut Res. Scheme, Ceylon.*

619. FRAPPA, C.

Un parasite du cocotier dans la région nord-ouest de Madagascar. (A parasite of coconuts in N.W. Madagascar.)

Agron. Trop., 1948, 3: 274-81, bibl. 12, illus.

An account of *Meliittomma insulare*, the damage it causes, and control measures taken against it.

Fruits.

(See also 10, 75, 112, 175, 259, 699, 716.)

620. AGETE PIÑERO, F.

Propagación de frutales vivero é injertos. (Propagation of fruit trees: nursery work and grafting.)

[*Mim. Publ.*] *Minist. Agric. Guatemala* 10, 1948, pp. 35.

Notes are given on the propagation of the following: citrus, avocado, mango, sapote, custard apple, cherimoyer, and mammey apple. Various types of graft are described. An account of the care of the plants in the nursery is followed by notes on transplanting and fertilizing.

621. VERHAAR, G.

Tartaric acid and other constituents in the fruits of *Tamarindus indica* L.

Chron. Nat., 1948, 104: 8-12, bibl. 20.

A short historical review is followed by botanical, medical and analytical data.—Proefstation W. Java, Buitenzorg.

622. TAI, E. A., AND TOPPER, B. F.

Transplanting cashew seedlings.

J. Jamaica agric. Soc., 1947, 51: 116-18.

An experiment is reported, as a result of which it is suggested that cashew seedlings—which have the reputation of being difficult to transplant—should be cut back hard at the time of transplanting from nursery beds and lifted with an undisturbed ball of adhering soil.

623. LUNAN, M.

Kerda [*Capparis elaeagnoides*].

E. Afr. agric. J., 1948, 14: 100.

A straggling, wild bush yielding a fruit which is exported on a small scale from parts of Tanganyika for sale to Indians throughout East Africa for use in pickles and chutneys. A brief description is given of the uses and trade in the fruit of this and other *Capparis* species.

624. CUILLÉ, J.

Recherches sur les produits insecticides, contre *Cosmopolites sordidus* Germ. (Investigations into insecticides against the banana weevil, *C. sordidus*.)

Fruits d'outre mer, 1948, 3: 291-8, bibl. 6, illus.

A study of various insecticides, amongst which 666 and polychlorocyclo-hexane products proved to be particularly effective. Despite, however, the promise of 666 products, they are only of very restricted use. They can be used in the treatment of stools intended for multiplication, but to employ them in traps would necessitate the addition of some attractive substance.—*Inst. des Fruits et Agrumes Col., Landreak, Guinée.*

625. MERNY, G.

La maladie de Panama des bananiers. (Panama disease of bananas.)

Fruits d'outre mer, 1948, 3: 211-15, bibl. 45, illus.

A popular article briefly touching on mode of infection, some factors governing infection and control measures. [No reference is made to the well-known work of Cheesman on breeding for disease resistance.]

626. WARDLAW, C. W.

Infectious chlorosis of bananas in the Cameroons.

Nature, 1948, 162: 894, bibl. 5.

On a tour of the British Cameroons the author found infectious chlorosis of banana in several plantations. At present this disease, which is potentially as destructive as bunchy top, occurs only occasionally in the Cameroons, but local environmental conditions might well lead to its spread. Infectious chlorosis, also referred to as heart rot, is caused by an aphid-transmitted virus, the vector being present locally. Symptoms and course of the disease are briefly discussed.

627. GROSZMANN, H. M.

Pineapple culture in Queensland.

Qd agric. J., 1948, 67: 78-100, illus.

A comprehensive, illustrated article giving practical advice on most aspects of pineapple growing, including information on varieties, mutations, plant selection, trace element deficiencies, and the control of fruiting by acetylene.

628. VAN LAERE, R.

La culture de l'ananas au Bas-Congo belge. (Pineapple growing in the Lower Belgian Congo.)

Fruits d'outre mer, 1948, 3: 219-24.

After some general information on varieties, soil, climate, manures, multiplication, and cultivation, experiments are reported on: pineapples intercropped between young citrus, age of plantations, choice of planting material, shade, and manuring. The variety Smooth Cayenne seems best adapted to the country.—Station d'I.N.E.A.C., M'Vuazi.

629. VAN OVERBEEK, J., AND CRUZADO, H. J.

Flower formation in the pineapple plant by geotropic stimulation.

Amer. J. Bot., 1948, 35: 410-12, bibl. 5, illus.

When vegetative plants of the Cabezona pineapple variety were placed in a horizontal position for a minimum of 3 days, flowers were produced, even out of the flowering season. This geotropic stimulus to flower induction is presumed to be the result of an accumulation of auxin to such a level that the vegetative growing point changes over to a floral apex. This theory is supported by the fact that Cabezona flowers readily when sprayed with naphthaleneacetic acid in the field, whereas Red Spanish, which did not respond to geotropic stimulus, also fails to respond to naphthaleneacetic acid treatment, except at double strength. This suggests that in the horizontally placed Red Spanish plants, the accumulation of auxin did not reach a sufficiently high level to induce flowering.

630. CARTER, W.

The effects of mealybugs feeding on pineapple plants grown in finely atomized nutrient solutions.

Phytopathology, 1948, 38: 645-57, bibl. 4, illus.

The symptom sequence of mealybug wilt of pineapple plants [H.A., 16: 2240] was followed in water vapour cabinets. Root elongation is arrested and death of the roots follows, but new roots are produced and

turgor is restored to the central leaves of the plants which proceed to grow normally. Sub-wilting symptoms, seen as reduction in plant growth, sometimes occur.—Pineapple Research Institute, Hawaii University.

Other crops.

(See also 375, 449, 474, 4970, 498d.)

631. JACQUES-FÉLIX, H., AND RABÉCHAULT, H.

Recherches sur les fibres de quelques *Urticacées* africaines. (Trials on the fibres of some African *Urticaceae*.)

Agron. trop., 1948, 3: 339-84, 451-88, bibl.

56, illus.

An account of a study of 10 African *Urticaceae* and their fibres, undertaken to determine their possibilities for textile manufacture. The following are considered to be worth further trial in field and laboratory: *Urera cordifolia*, *Girardinia condensata*, *Fleurya podocarpa*, *Pouzolzia andogensis*.

632. LEES, P. W. Q.

The Mauritius fibre industry: investigation of the means of decorticating *Furcraea* leaves.

Rev. agric. Maurice, 1948, 27: 163-9.

This report is complementary to the one by G. W. Lock on the agricultural aspects of the Mauritius hemp industry. The various types of decorticators now in use in the island are briefly described. None of them is considered suitable from the standpoint of output. The author specifies the type of decorticator required. A pilot plant to this specification is to be constructed in Britain.

633. BOURIQUET, G.

Les engrais chimiques et le vanillier. (Chemical fertilizers and vanilla.)

Agron. trop., 1948, 3: 497, bibl. 3.

A note on the observed lack of response of the vanilla plant to inorganic fertilizers.

634. BOURIQUET, G.

La germination des graines de vanillier. (The germination of vanilla seed.)

Agron. trop., 1948, 3: 498-9, bibl. 3, illus.

A note on the work of M. Maistre, Tananarive, in which seedlings of *Vanilla planifolia* were successfully raised in Erlenmeyer flasks containing damp compost made up of 3 parts *Sphagnum* and 2 parts *Polypodium*. The compost was sterilized before sowing the vanilla seeds and inoculated with the appropriate mycorrhiza.

635. ASTHANA, R. P.

The role of cuttings in the dissemination of foot-rot of *Piper betel*.

Indian J. agric. Sci., 1947, 17: 223-5, bibl. 3.

The spread of leaf-rot and foot-rot caused by *Phytophthora parasitica* to new plantings of betel-vine can be controlled by using only the first four top cuttings and treating them with 2:2:50 bordeaux mixture for one hour before planting. Lower cuttings should not be used as they may carry the fungus internally.

636. COSGROVE, D. J., ISLIP, H. T., AND THAIN, E. M.

Oil of *Melaleuca bracteata* from Kenya.

Bull. imp. Inst. Lond., 1948, 46: 46-50, bibl. 4.

A report on a sample, received in 1946, derived from leaves and twigs of plants 3 ft. high, the yield of oil being 0.5%. The commercial prospects of the oil are rather doubtful, but possibly a market might be found for it as a source of methyl-eugenol in the preparation of eugenol derivatives.

637. MITCHELL, W.

Oil of *Melaleuca bracteata* from Kenya.

Bull. imp. Inst. Lond., 1948, 46: 50-2, bibl. 2.

A report on a sample received in 1947. It would appear that this oil is unlikely to be of commercial importance or value for perfumery or flavouring purposes.

638. KRISHAN, R.

Cultivation of *Khus* (*Vetiveria zizanioides*).

Indian Fmg., 1946, 8: 578-80, illus. [received 1948].

Mainly concerned with the cultivation of this grass for its scented roots which yield [vetiver] oil.

639. CHIAROMONTE, A.

L' "*Achaea catella* Guen." nella Somalia italiana. (*Achaea catella* in Italian Somaliland.)

Riv. Agric. subtrop., 1948, 42: 181-6, bibl. 28.

This fruit-piercing moth does great damage to the castor oil plant in Somaliland. The author discusses what is known of it and similar Noctuid moths in the tropics and pleads for an early investigation into its biology as a first step towards control.

640. BIRCH, H. F., AND DOUGHTY, L. R.

The distribution and interrelationships of the alkaloids in the bark of *Cinchona ledgeriana*.

Biochem. J., 1948, 43: 38-44, bibl. 4.

These investigations were undertaken to determine the distribution of the alkaloids (total, individual and amorphous) throughout the whole bark, and to relate this distribution with the form of the tree, the metric characteristics of the bark and the proportions of the various alkaloids. Some interesting relationships have been established.—*Cinchona* Res. Organization, Amani, Tanganyika.

641. DAWSON, R. F.

***Cinchona* polyploids.**

Lloydia, 1948, 11: 81-5, bibl. 10.

The possibility of increasing the alkaloid production of certain plants by increasing their chromosome number has been realized for some time. The author attempted to secure polyploids of three commercial species of *Cinchona* by treatment with colchicine in order to investigate the possibility of a relationship between chromosome number and alkaloid production in this genus. An account of the first stage of this work is presented. [From author's summary.]

642. LITTLE, R. R.

Histologie van cinchona. (Histology of barks of cinchona and some related genera occurring in Colombia.)

Abstracted from *Rev. Acad. colomb.*, 1947, 7: 404-25, in *Chron. Nat.*, 1948, 104: 155.

Microscopic characteristics, such as the form and

grouping of the phloem tubes, and of the stone cells in the bark, can be used for identifying the various species of *Cinchona* and *Remijia* grown in Colombia. A detailed identification table is given.

643. SAYED, I. A.

The milk-tree or the cow-tree (*Brosimum galactodendron* of the Caracas, Venezuela.

Indian Fmg., 1948, 9: 246-8, bibl. 10.

A popular article describing the tree, its geographical distribution, and the character, composition, and uses of its "milk"—an article of diet amongst the original inhabitants of Venezuela.

644. PUREWAL, S. S., AND RANDHAWA, G. S.

Studies in *Hibiscus esculentus* (Lady's finger).

1. Chromosome and pollination studies.

Indian J. agric. Sci., 1947, 17: 129-36, bibl. 15, illus.

Amongst the findings reached is the statement that the fruit pod completed its growth in 15 days, the best time for picking being 6-7 days after the opening of the flower.

645. CAPOOR, S. P., AND VARMA, P. M.

A mosaic disease of *Lagenaria vulgaris* Ser. in the Bombay province.

Curr. Sci., 1948, 17: 274-5, bibl. 4, illus.

Notes on various aspects of a virus disease, not previously recorded, which causes appreciable damage to this gourd.

Noted.

646.

a BARQUERO, H.

History of the Costa Rica cacao industry.
Cacao Inform. Bull., 1948, 1: 12: 1-2.

b CHEESMAN, E. E.

Classification of bananas. III. Critical notes on species. (c) *M. paradisiaca* and *M. sapientum*, (d) *M. banksii*.
Kew Bull., 1948, 2: 145-57, bibl. 18, illus.
For I and II, see *H.A.*, 18: 2230 and 3018c.

c CORNEY, N. S., FURLONG, J. R., AND KIRBY, R. H.

Manila hemp from Malaya and Dominica.
Bull. imp. Inst. Lond., 1947, 45: 336-45.
Reports on fibre samples sent for examination and evaluation.

d DIAKONOFF, A.

Enkele algemeene problemen in verband met het vraagstuk van de stengelboorders van het suikerriet op Java en van hun parasieten. (Some general aspects in connexion with the problem of stalk borers of sugar-cane in Java and their parasites.)
Chron. Nat., 1948, 104: 230-6, bibl. 7.

e ETHERINGTON, I.

La vainilla, su cultivo y acondicionamiento. (Vanilla growing and preparation.)
[*Mim. Publ.*] *Minist. Agric. Guatemala* 12, 1948, pp. 7.

- f FRIES, R. E.
Contributions to the flora of tropical America: XLVII. *Annonaceae* new to British Guiana. *Kew Bull.*, 1948, 2: 229-35.
- g DE HAAN, I.
Bemesting met kali en fosforzuur van een theeaanplant op sterk verwerde laterietgrond. (The effect of potassium and phosphate fertilizers on tea growing on a heavily weathered laterite soil.) [English summary 2½ pp.] *Arch. Theecult. Ned.-Ind.*, 1948, 16: 53-69, bibl. 4.
- h HENDRICKX, F. L.
Sylloge Fungorum Congensium. Catalogue des champignons signalés au Congo Belge et au Ruanda-Urundi. (Fungi noted in the Belgian Congo and at Ruanda-Urundi.) *Publ. Inst. nat. Étude agron. Congo belge, Ser. Sci.* 35, 1948, 216 pp., 100 fr.
- i HONIG, P.
Vitaminen in suikerriet en suikerrietproducten. (Vitamins in sugar-cane and sugar-cane products.) [English summary 18 ll.] *Chron. Nat.*, 1948, 104: 303-6, bibl. 4.
- j PATTABHIRAMAN, T. V.
The coffee stem borer [in South India] (*Xylotrechus quadripes* Chev.). *Mon. Bull. Indian Coffee Bd*, 1948, 12: 8: 5-6, bibl. 5.
- k PORTÈRES, R.
Les plantes indicatrices du niveau de fertilité du complexe cultural édapho-climatique en Afrique tropicale. (Fertility indicator plants found in the cultural edapho-climatic complex of tropical Africa.) *Agron. trop.*, 1948, 3: 246-57, bibl. 20, illus.
- l PORTÈRES, R.
Notes sur la culture du *Coffea arabica* au Cameroun Français. (Notes on the cultivation of *Coffea arabica* in the French Cameroons.) *Agron. trop.*, 1948, 3: 385-410, bibl. 3, illus. Based on notes made during a visit in 1943.
- m POWELL, L. A.
Manuring vegetable gardens [in Jamaica]. *Ext. Circ. Jamaica Dep. Agric.* 12, 1948, pp. 6.
- n RAFAEL RIVERA, H.
Cacao cultivation in Antioquia, Colombia. *Cacao Inform. Bull.*, 1948, 1: 12: 2-3.
- o RAHMAN, K. A., DALBIR SINGH AND CHEEMA, P. S.
Field-studies on sugarcane black bug (*Macropes excavatus* Dist.) in the Punjab. *Indian J. agric. Sci.*, 1947, 17: 291-5, bibl. 2.
- p RAI, J. N.
Internal breakdown of guava fruit (*Psidium guajava* L.). *Curr. Sci.*, 1948, 17: 273-4, bibl. 5, illus. Apparently a physiological disorder.
- q SPOON, W.
Ricinus op de Bovenwindsche eilanden. (The castor oil plant in the Dutch Windward Islands.) [English summary ½ p.] *Ber. HandMus. kolon. Inst. Amst.* 206 [received 1948], reprinted from *De West-Ind. Gids*, 1945, 26: 8: 225-8, bibl. 4.
- r VOLLEMA, J. S.
Tapsysteem en bruine binnenbast bij geselecteerd Heveaplantmateriaal met hoog productievermogen. (The influence of tapping system on brown bast in selected high-yielding hevea clones.) *Bergcultures*, 1948, 17: 33, 35.

PACKING, STORING AND PLANT PRODUCTS.*

Packing and transport.

647. ANON.
L'emballage sans couvercle. (Packing without lids.) *Fruit belge*, 1948, 16: 137-42, illus.
- A discussion of commercial methods for the packing and despatch by rail of fruit and vegetables in boxes without lids.
648. CROCE, F. M.
Desecacion y deshidratacion de higos. (The drying and dehydration of figs.) *Rev. mens. B.A.P.*, 1948, 31: 363: 36-7, 39, 52-3.
- The manipulation, treatment during drying, and the packing of the dried product for export are described in detail.
649. POWELL, H. R.
Fruit and vegetable shipments to Singapore. *J. Agric. W. Aust.*, 1948, 25: 157-85, 236-44.

*N.B.—For the highly technical detail involved in storage problems and for the processing of foodstuffs see Food Science Abstracts, obtainable H.M.S.O., Kingsway, London.

An account of a visit to Singapore to inquire into: various phases of the fruit export trade from Western Australia, particularly with reference to the conditions under which the non-refrigerated cargoes of fruit travel; the condition on arrival of shipments from Australia; the quality standards observed by other exporting countries on this market; and the difficulties under which Australian exporters are placed, and possible improvements. Reports are submitted on grapes, citrus fruits, tomatoes and potatoes. Details are given in the second article on the condition of West Australian apples (chiefly Granny Smith) on arrival at Singapore. It is stated that the chief defects in Granny Smiths were yellowing, scald, and pressure marks.

Storage.

(See also 150, 195, 596, 697, 706.)

650. BOVAY, E.
La conservation des fruits en frigorifique sous atmosphères contrôlées. (Gas storage of fruit.) *Rev. romande Agric., Vitic.*, 1948, 4: 71-2.
- After a brief review of the results obtained in gas

storage experiments in Britain, U.S.A., and Holland, the author reports on gas storage trials with pears carried out at Lausanne research station for two seasons. An atmosphere of 10% CO₂+10% O₂+80% N₂ and a temperature of +0.3° C. to -0.3° C. were maintained. Doyenné du Comice was removed on 20 March, three other varieties being kept until 27 April. Losses ranged from 2% to 8% according to variety. At the end of the storage periods the pears had a good flavour and fetched high prices.

651. VAN HIELE, T.

De invloed van "Obstal" bij de bewaring van fruit. (The effect of "Obstal" in the preservation of fresh fruit.) [English summary 1/2 p.]

Meded. Direct. Tuinb., 1948, 11: 553-7.

An account of trials with Obstal, a German preparation for preserving fruits during storage. The results obtained (data tabulated) are not encouraging.

652. KIDD, F., AND WEST, C.

Some problems involved in the storage of mixed varieties of apples.

The Fruit Year Book 1948, Royal Horticultural Society London, 1948, pp. 43-9.

The authors sum up present relevant knowledge as follows: There is scientific evidence that the volatile substances given off by apples, particularly during their climacteric and post-climacteric phases, may (i) retard or accelerate the ripening processes of less mature fruit, either of the same or of different varieties; (ii) facilitate or inhibit, either directly or indirectly, the germination and development of rot-producing organisms; and (iii) be the direct cause of functional disease. These volatile substances may exert several distinct effects, and these may vary according to the maturity of the fruit, concentration of the volatiles, temperature, time of exposure, and the nature and amount of other gases present. The sorting out of this complex of inter-relationships is only beginning, but the eventual results are likely to be of major practical importance.

653. VAN HIELE, T.

De Jonathan en zijn dedrag tijdens de bewaring. (The behaviour of the Jonathan apple in storage.)

Fruittelt, 1948, 38: 642-3.

To determine the cause of varying results from the storage of Jonathan apples, fruit was picked on three dates, with weekly intervals, starting on 19 September, 1947, half of each batch being stored immediately at 3° C. and the other half kept in boxes in a shaded place for 14 days before being stored. The fruit was examined on 11 March, 1948, and data obtained for sound fruit and those showing storage disorders. The best results were obtained with the apples picked early and stored immediately.

654. FIDLER, J. C.

The conserving influence of oxygen in respirable substrate.

Ann. Bot. Lond., 1948, 12: 421-6, bibl. 6.

Estimations of the loss of respirable substrate in experiments with two varieties of apple at three temperatures and in three storage seasons, and with

oranges, show that the rate of loss is less in the presence of oxygen than in its absence. [From author's summary.]—D.S.I.R., Ditton Lab., E. Malling, Kent.

655. KESSLER, H.

Hautbräune, ein gefährlicher Feind unseres Lagerobstes. (Apple scald, a dangerous storage disease.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 318-22, 363-5, bibl. 12.

A review based, with one exception, on English and American publications.

656. BREVIGLIERI, N.

Indagini ed osservazioni sulla conservazione delle mele in Palestina. (Apple storage investigations in Palestine.)

Riv. Ortofrutt. ital., 1948, 32: 159-61.

Investigations covered the effects of environmental factors during growth and physiological deterioration during cold store. Varieties studied included Peasgood, Rome Beauty, Delicious, Jonathan and others. *Time of picking*. The best time was 1 week before that most suitable for immediate marketing. This could best be determined by the iodine test, which is here described. *Rootstock*. Apples kept best from trees worked on seedlings, next best from those on a local variety, and worst from trees on doucin [MII]. *Irrigation*. The tests indicated that apples from trees which had definitely profited from irrigation at a late stage of development kept better than those deprived of irrigation at an earlier stage. *Locality*. Hill district best, plains second, sea level worst. *Variety*. Rome Beauty—contrary to American experience—did not keep well. Delicious and Jonathan kept best. *Bitter pit*. Differed somewhat with varieties. Occurred only in prematurely picked fruits. *Scald*. Occurred after several months' storage in fruits picked too soon. Oil wraps delayed its onset.

657. AUBERT, P.

Frigorifique et cave Krebser. (Cold storage [of apples] and the Krebser cellar.)

Rev. romande Agric., Vitic., 1948, 4: 63-4, bibl. 1.

In a previous paper (*ibid.*, 1947, 3: 69-71), in which he compared the merits of commercial cold storage with those of the Krebser cellar for the storage of apples, the author had reached the following conclusions: the temperature in the Krebser cellar was slightly higher; atmospheric moisture was about equal in both cases; losses by weight and especially from rots, were higher in the Krebser cellar; losses as a result of physiological troubles were higher in cold storage; cold storage allowed a longer period of preservation. In the present article net profits are compared, taking into account the expenses involved in both methods of storage. The varieties used in these trials were Canada Reinette and Reinette de Champagne, each lot consisting of 10,000 kg. Profits for Reinette de Champagne were: Krebser cellar No. 1, Fr. 5,977; cold storage Fr. 5,907; and Krebser cellar No. 2 Fr. 5,781. With Canada Reinette the figures were slightly in favour of cold storage. This calculation disregards the better quality apparently obtained in the Krebser cellar. Data for losses from various causes are tabulated.—Lausanne research station.

658. BROADFOOT, H., AND WHITTAKER, E. C.
Superficial scald of Granny Smith apples.
Agric. Gaz. N.S.W., 1948, **59**: 407-9, 413,
 illus.

The Granny Smith apple grown extensively in New South Wales, is very susceptible to scald when held in cold storage for long periods, and heavy losses may result if precautions are not taken. Points to remember are: (1) pick the fruit when the dark green colour is changing to a lighter shade, (2) keep in common store no longer than two weeks, (3) wrap in oiled wraps prior to storing, and store at a temperature of 33° to 34° F. (4) use the alternate-row method of wrapping or oiled sheets if oiled wraps are scarce, (5) for long storage use only good, sound fruit of medium or small size from reasonably aged trees carrying good crops, (6) if the development of scald is suspected, allow the fruit to remain 2 or 3 days after removal from store and examine before marketing.

659. SMOCK, R. M., AND SOUTHWICK, F. W.
Air purification in the apple storage.
Bull. Cornell agric. Exp. Stat. **843**, 1948,
 pp. 52, bibl. 11, illus.

Consistently good scald control was obtained using activated coconut-shell carbon when varieties were stored separately. Scald was generally reduced when different varieties were stored together, but good control was not always obtained on Rhode Island Greening in such conditions. The method is in general as effective with mixed varieties as the use of shredded oiled paper. Storage life was generally extended by 3 or 4 weeks. Bromination of the carbon did not improve results. [From authors' summary.]

660. BOVEY, E.
 Essais de conservation de raisins de table en
 frigorifique. (**Cold storage of dessert grapes.**)
Rev. romande Agric., Vitic., 1948, **4**: 69-71.

The storage temperature was lowered from +5° C. at the end of September to +1° C. a month later. From then onwards a temperature of between -1° C. and +1° C. was maintained. On 8 January the grapes were examined by a testing panel. Although the very sweet berries of the 1947 season did not preserve their flavour quite so well as those of the previous year [see *H.A.*, 17: 1472, also for methods of disinfection used], the verdict was that the storage of grapes for the Christmas season is a profitable enterprise. Comments on 11 varieties are tabulated. The trials are to be continued on a bigger scale.—Lausanne research station.

661. KIENHOLZ, J. R.
Chemicals aid Hood River pears.
Better Fruit, 1948, **43**: 2: 12, 21.

Washing Anjou pears after picking in a bath of Dowicide C reduced the development of storage rots from 5.9% in the controls (washed in a 0.5% hydrochloric acid bath) to 1.8% at the end of the experimental period in February and March. The saving in re-packing before distribution was therefore very considerable. The trials were carried out on a semi-commercial scale.—Bureau of Plant Industry, Hood River, Oregon.

662. CAMICI, L.
 La "mummificazione delle castagne" da
Phomopsis viterbensis sp. N. (**Mummy dis-
 ease of chestnuts.**) [English summary 17 ll.]
Ann. Sper. agrar., 1948, **2** [n.s.]: 557-66,
 bibl. 5, illus.

A disease of stored chestnuts probably due to a fungus isolated from diseased specimens. It is thought to reach the chestnuts through their apices and to attack them in store. Specific methods of control are not given.—Staz. Pat. Veg. Rome.

663. GUISCAFRE-ARRILLAGA, J.
**Sensitivity of *Penicillium digitatum* to 2,4-
 dichlorophenoxyacetic acid.**
Plant Dis. Repr., 1948, **32**: 248-50.

The experiments recorded show that two proprietary preparations of 2,4-D at 3% concentration had a strong inhibitory action on the germination of conidia of *Penicillium digitatum*, the cause of a post-harvest rot of citrus fruits.

664. WOKES, F., AND NUNN, G.
Vitamin C in potatoes.
Nature, 1948, **162**: 900-1, bibl. 7.

In potatoes grown at Cheltenham and stored in a clamp the vitamin C content, after the usual autumn drop, remained at a steady level during November and December, but fell steeply in January and February. While the authors agree with other workers that vitamin C content in storage is not affected by temperature, they found that it was related to relative humidity. The explanation suggested is that a high moisture content induces sprouting, in the process of which vitamin C is used up. Consequently, there should be also a correlation between vitamin C content and total solids, an assumption which was supported by preliminary analytical data.

665. MAHAJAN, L. D.
Absorption power of plant materials [chillies].
Indian J. agric. Sci., 1947, **17**: 58-62, bibl. 4.

The average maximum amount of moisture which air-dried chillies can absorb is shown as about 27%, a high figure compared with grains.

666. WHITE, W. H.
**Report on experiments with methyl bromide
 as a fumigant for stored tobacco.**
Publ. U.S. Dep. Agric. Bur. Ent. Pl. Quar.
 E-753, 1948, pp. 10.

The experiments described show that methyl bromide is an effective fumigant against the cigarette beetle, *Lasioderma serricorne* (F.), and the tobacco moth, *Ephestia elutella* (Hbn.). Injury to cigar tobaccos has been reported and it should be recognized that the use of methyl bromide on cigar tobaccos involves a risk.

667. KESSLER, H., SCHÜTZ, F., AND EICHEN-
 BERGER, W.
 Die verschiedenen Aufbewahrungsmöglich-
 keiten für Steckzwiebeln und Samenträger-
 Zwiebeln. (**The storage of onion sets and
 of onion bulbs for seed production.**)
Gärtnernmeister, 1948, **51**: 326, 335-6, 344,
 bibl. 3.

Onion sets of 3 varieties with a diameter of 8-16 mm.

were stored at temperatures of 8-16° C., with a relative humidity of 45-65%; at 0° C., with a humidity of 74-79%; and at -1° C. with a somewhat higher humidity. The smallest losses from rotting and the smallest percentage of sprouted bulbs occurred at 0° C. Cultivation trials the following year showed that bulbs stored at 0° C. and -1° C. produced much higher yields than those kept at 8-16° C., the average bulb weights for the variety Oensinger, for instance, being 73.5 g., 75.1 g. and 54.3 g. respectively. For the storage of bulbs for seed production, on the other hand, a temperature of 8-16° C. was more favourable, since cold storage has the tendency to reduce flowering. —Wädenswil Research Station.

668. SMOOT, J. J., AND JEFFERS, W. F.

Studies of end rot of stored Maryland Golden sweet potatoes.

Abstr. in *Phytopathology*, 1948, **38**: 576-7.

Fusarium end rot (*F. oxysporum*) causes sweet potatoes to become shrivelled with hardened ends, usually on small potatoes. *Diaporthe batatis* produces a collapsed darkened dry decay of roots of all sizes.

669. DELONG, D.

The super market's roach problem.

Soap san. Chem., 1948, **24**: 8: 143-7.

In American stores cockroaches are a troublesome pest of fruit and vegetables and of other foods offered for sale. Baiting is recommended as a control measure.

Plant products.

(See also 84, 94, 395, 396, 400, 406, 595, 621, 697, 706.)

670. HUGHES, E. B.

Foods.

Reps. Progr. appl. Chem., 1948, **31**: 556-601, bibl. 344.

Includes a review of the literature on the vitamin content of fruit and vegetables and on vitamin preservation in fruit and vegetable dehydration, canning and storage.

671. SREENIVASAN, A., AND VAIDYA, R. M.

Determination of carotene in plant materials.

Analyt. Chem., 1948, **20**: 720-2, bibl. 52.

A rapid method has been worked out, which is suitable both for the analysis of green, leafy materials and of fresh fruits and vegetables.—Bombay University.

672. GOLDBLITH, S. A., AND HARRIS, R. S.

Estimation of ascorbic acid in food preparations.

Analyt. Chem., 1948, **20**: 649-51, bibl. 11.

The dinitrophenylhydrazine and indophenol methods are equally valid for measuring the ascorbic acid content of garden-fresh vegetables. Both methods may be employed to establish the freshness of vegetable foods. [Authors' summary.]—Massachusetts Institute of Technology, Cambridge.

673. JAMES, D. P.

Fruits and their vitamins.

The Fruit Year Book 1948, Royal Horticultural Society, London, 1948, pp. 132-9.

The amounts are noted of the following substances in common English fruits:—vitamins A (axerophthol), B, C, D, E (and β tocopherols), and K (methyl phytyl naphthoquinone), aneurin (B₃), riboflavin

(formerly B₆), nicotinic acid (or niacin), pantothenic acid and biotin (formerly vitamin H). The methods of determination are not stated.

674. HOLLAND, B. R.

The terpenes of oil sweet goldenrod.

J. Amer. chem. Soc., 1948, **70**: 2597-8, bibl. 5.

The terpene constituents of the essential oil of *Solidago odora* were determined.—Agricultural and Mechanical College of Texas.

675. ANON.

By-products of sisal waste.

Times Rev. Indust., 1948, **2** (n.s.): 14: 21.

The fleshy, non-fibrous waste from the decorticating process of sisal will yield the following by-products, amongst others: wax, chlorophyll, xanthophyll, carotene, pectin, pectates, saponins, glucosides, hydroxy acids, sugars, lignin, plastics and wall boards. If a profitable use can be found for this fleshy waste the effect on the economy of the sisal industry would be considerable. The possibilities are briefly discussed.

676. HONIG, P.

Grengebieden van den chemicus. (The role of chemistry in tropical agricultural industries.)

Chron. Nat., 1948, **104**: 121-4.

Report of a lecture to the Dutch Chemical Society in Batavia. The separation of sugar from the water and impurities is a purely chemical problem. There are many problems in the rubber industry, too, some of them discussed here, that can be solved only by fundamental chemical research.

677. VAN GILS, G. E.

Latex research in Indonesia.

Chron. Nat., 1948, **104**: 311-14.

Report of a lecture given to the Koninklijke Natuurkundige Vereeniging. A review of the growth of the rubber industry and its problems. Two main problems have concerned investigators from the beginning of the industry to the present day: the determination of the rubber content of latex, and the coagulation phenomena. De Vries solved the former by showing the relationship between the specific gravity of the latex and its rubber content. The part played by microbial activity, and by soap formation, in spontaneous coagulation is discussed in the light of recent research into the "yellow fraction" of latex. The mechanism of acid coagulation is explained, but that of pre-coagulation needs further investigation.

678. VAN GILS, G. E.

Recente ontwikkelingen op het gebied van de latex technologie. (New developments in latex technique.)

From an address given to the Chemical Society, Buitenzorg. *Chron. Nat.*, 1948, **104**: 219-20.

A detailed comparison of the methods of moulding rubber, developed during the war. The French method, introduced by Chassaing, is an improvement on the old Kaysan method, in that the addition of ammonium salts is rendered unnecessary. Igevin M.50, a substance discovered by the Germans, has the property of allowing latex to coagulate in warm conditions. The Dunlop process for highly tear-resistant rubber, and the Positex process, are described.

Noted.

679.

- a ANDERSON, W. S.
Loss of carotene in preserved samples of sweetpotatoes.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 393-4, bibl. 1.
- b BARTON-WRIGHT, E. C., AND DAWSON, E. R.
The fermentation industries.
Reps. Progr. appl. Chem., 1946, **31**: 540-55, bibl. 82.
Includes a discussion of hop literature.
- c CALDWELL, J. S., AND OTHERS.
The utilization of sweet peppers. Part II. Dehydration.*
Fruit Prod. J., 1948, **27**: 247-52, 262, bibl. 23.
- d CRANG, A., JAMES, D. P., AND STURDY, M.
The retention of ascorbic acid in [domestically] preserved fruits.
Chem. Industr., 1948, pp. 583-5, bibl. 5.
- e (D.S.I.R.)
Fruit and vegetable storage conference, Sittingbourne, Kent, March 1948.
Publ. nat. Fmrs Union, Maidstone, Kent, 1948, pp. 11.
For list of papers read see *H.A.*, 18: 2255.
- f DUNN, H. C., HILDITCH, T. P., AND RILEY, J. P.
The composition of seed fats of West Indian citrus fruits.
J. Soc. chem. Ind. Lond., 1948, **67**: 199-203, bibl. 7.
- g GLENDENNING, K. A., AND WRIGHT, D. E.
Production of syrups from wheat, potato, tapioca and waxy cereal starches.
Canad. J. Res., 1948, **26**, Sec. F, pp. 284-96, bibl. 16.
- h GORSELINE, H. E.
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J. Ass. off. agric. Chem. Wash., 1948, **31**: 519-21.
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* For Part I, Canning, see *ibid.*, 1948, **27**: 164; *H.A.*, 18: 1498.

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- j LE RICHE, F. J. H.
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Sci. Bull. S. Afr. Dep. Agric. **268**, 1947, pp. 14, bibl. 11, being *Fruit Res. Tech. Ser.* 14 [received 1949].
- k ROTEN, E.
Fruits à pépins et marcs de fruits utilisés comme fourrage. (The utilization of whole pome fruits and pome fruit residue as feeding stuff.)
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- l SAVUR, G. R., AND SREENIVASAN, A.
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J. Soc. chem. Ind. Lond., 1948, **67**: 190-3, bibl. 27.
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- n SHORT, G. R. A.
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- o SINGH, M. P.
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An account of a wartime development.
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Snelvriesconserven van Indische vruchten. (Quick-freeze processing of East Indies fruits.)
Ber. HandMus. kolon. Inst. Amst. **202** [received 1948], reprinted from *Econ.-Stat. Ber.*, 1944, **29**: 1446: 130, bibl. 16.

NOTES ON BOOKS AND REPORTS.

680. BARNES, H. F.
Gall midges of economic importance. Vol. IV. Gall midges of ornamental plants and shrubs.
Crosby Lockwood & Son, London, 1948, pp. 165, 10 plates, 2 text figures, bibl. 343, 15s.

In the present volume the author deals with the midges that infest plants and shrubs in forty-four genera of his own selection based on an extensive knowledge of the world list of host plants of gall midges. Though a few specialist growers, economic botanists and entomologists will be interested to know that gall midges infest *Asclepias*, *Impatiens*, *Bridelia* and *Parthenocissus*, to name only a few of the host plants, many readers will be interested in the full and interesting accounts of the species attacking, for example, box, chrysanthemum,

rose, violet and pansy. The general pattern of the author's treatment may be gathered from the following summarized examples. The Chrysanthemum Gall Midge has been known in the United States of America for many years and was introduced into Britain in 1927. Early realization of its importance and prompt administrative action resulted in the suppression of the outbreak. Not so a second introduction in 1936. This time the insect became established in commercial stocks and during the war years it spread and may now occur almost anywhere in England, Wales, or Scotland. An infestation in Northern Ireland appears to have been stamped out. The species is primarily a glasshouse pest but it may survive out-of-doors, even through the winter. Under favourable conditions generation after generation of

the midges follow each other continuously throughout the year. No commercial variety of chrysanthemum has yet been found to be immune, though, both in England and America, some varieties are more heavily infested than others. The insect is readily distributed on nursery stock and slight infestation is easily overlooked. Control measures include fumigation with nicotine, and dipping of cuttings; spraying with lauryl thiocyanate appears promising and in tests has killed the larvae in the galls. Again, most growers know that gall midges attack roses, but many will be surprised to learn that ten named species are reported on the rose. Glasshouse roses in America are attacked by the Rose Bud Midge. In Britain the Red Bud Borer is widely distributed and troublesome; its maggots feed on the sap between the two layers of cambium in newly budded or grafted roses and prevent union. In a severe case near Nottingham in 1929 this pest completely destroyed 6,000 newly budded roses. Control measures have included the use of naphthalene and linseed oil or smearing with vaseline at grafting. The author deals similarly with the Violet Leaf Midge and other pests. The bibliography of the gall midges of flowers and shrubs is a lengthy one and Dr. Barnes gives 343 references. He also includes most valuable separate indices of the gall midges and of the host plants covered in this informative and well-illustrated volume.

H.W.M.

681. BATCHELOR, L. D., AND WEBBER, H. J.
The citrus industry. Vol. II. The production of the crop.
University of California Press, Berkeley and Los Angeles, and Cambridge Univ. Press, England, 1948, pp. 933, bibl. 1,136, \$10.

This long-awaited second volume of *The Citrus Industry* appears five years after Vol. I, which was devoted to the history, botany and breeding of citrus crops [see *H.A.*, 14: 946]. It is an outstanding contribution to citrus literature, being in the form of a symposium by no less than sixteen authors, each of whom writes with specialist knowledge based on experimental work—an admirable method of presentation but one which leads to a certain amount of overlapping and, sometimes, to different interpretations of the same phenomena. The editors' plan has been to present the subject in such a way as to be applicable anywhere in the citrus-growing world, but since the text has been prepared by Californian investigators it is inevitable that Californian practice should loom largest. With this the foreign reader will find no fault, knowing the high stage of advance achieved by the citrus industry of that State. The wide scope of the book can best be illustrated by quoting the following chapter heads into which it is divided: nursery methods, the character and reaction of rootstocks, choice of rootstocks, selection of orchard site, planning and planting, cultivation, principles and methods of fertilizing [manuring], cover crops and green manures, pruning, irrigation, diseases and their control, biological control of insect pests, insects and mites, quarantine services, injury by rodents, frost protection, effect of freezes and treatment of frost-injured trees. The subject of rootstocks has received particular attention. This is very appropriate at the present time when the relation of rootstocks to the spread or

prevention of various virus and fungus diseases has brought about a keener interest in rootstock problems. The chapters on choice of rootstocks, their characters and reactions, incorporate an account of the main results and conclusions from over 25 years' work at the California Citrus Experiment Station—probably the most extensive and longest-continued experiments ever conducted with citrus rootstocks. Chapter XI, Diseases and their control, by H. S. Fawcett and L. J. Klotz, is a summary of the much fuller information given by the same authors in their book *Citrus Diseases and their Control* (McGraw-Hill, N.Y.). Similarly the subject of Chapter XIV, Insects and mites and their control, by A. M. Boyce, is more fully treated in *Insects of Citrus and other Sub-tropical Fruits* by H. L. Quayle (Comstock Publ. Co., N.Y.).

This second volume of *The Citrus Industry*, a worthy successor to the first, can be unhesitatingly recommended to research workers, students and growers, but the last-named may find that some of the explanations given are too technical to be properly understood. We look forward to Vol. III, Harvesting, marketing and utilization, which will complete the trilogy.

A.G.G.H.

682. BOEUF, F., AND VESSEREAU, A.
Recherche et expérimentation en agriculture. (Investigations and experimental technique in agriculture.)

Vol. I. Boeuf, F. *Objectifs de la recherche agronomique, méthodes d'expérimentation. (Aims of research and experimental methods.)*
J. B. Baillière et fils, 19 rue Hautefeuille, Paris, 1948, pp. 490, 1,200 fr. + 50 fr. postage.

The first of these volumes essays the task of explaining the basis of agricultural research, its aims and methods. In Part I the author discusses the economic value of investigations and the general directions in which further knowledge is wanted, e.g. plant improvement, nutritional problems, plant protection, environmental factors. He also notes French work on particular crops. In Part II he considers the preliminary studies which are necessary before investigations can be reasonably undertaken, e.g. on the economics of the subject, on work already done in particular fields, etc. Next he notes the all-important part played by genetics in plant problems and the necessity of paying adequate attention to this and to biometrical questions. He then proceeds to the actual practical measures which can be taken to improve crop plants, e.g. selection, hybridization, inducement of polyploidy and such aids to improvement as are afforded by vegetative propagation. Finally and at some length—some 200 pages—he deals with the all-important subject of environmental factors under the chief headings of soil, soil water, climate, biological surroundings. Innumerable examples illustrate his ideas and the whole forms an excellent introduction for anyone on the threshold of a career of agricultural research work or as an introduction to Vessereau's work on statistical method [see below].

D.A.

Vol. II. Vessereau, A. *Méthodes statistiques en biologie et en agronomie. (Statistical method in biology and agriculture.)*
J. B. Baillière et fils, 19 rue Hautefeuille, Paris, 1948, pp. 381, 2,000 fr. + 50 fr. postage.

Quite recently there appeared the first comprehensive book* on agricultural statistics in the French language. Professor Vessereau has now written a second, and it is of interest to compare the two. They are as different as possible and complement one another to a remarkable degree; the first deals chiefly with the general strategy of research methods, while the second sets out in detail the necessary statistical techniques.

Unfortunately this is not a book that can be recommended to the general reader, though a teacher of statistics will find much of value in its careful exposition of fundamentals. Many of the author's lines of approach are novel and all are interesting; but the reader's mind is so much burdened with sections that are unnecessary or even misleading that it is no book for the inexperienced or indiscriminating.

Thus, the author continually sets out modern methods side by side with those they have superseded, but does not say which is better. In particular, several subjects are dealt with first by the old-fashioned "large sample" approach and then by the modern "small sample" technique. But since a method that will work with few data will work also with many, these accounts could well have been halved. A more serious example is afforded by the explanation of inverse probability (which is not only out of date but fallacious) before the section on likelihood, though admittedly the reader is here told which is preferable.

It must be remembered that this book is intended for French readers. In his preface, the author comments that most writing on statistics is the work of "Auteurs anglo-saxons" and is "*Assez mal adaptée aux exigences de la pensée française*". Doubtless many French workers will be helped by this exposition of statistical methods by one acquainted with their difficulties; but, before it goes into any further editions, it needs drastic pruning and a certain amount of rearrangement. Thus revised it can fill an important gap in French scientific literature. S.C.P.

683. BRADFORD, S. C.

Documentation.

Crosby Lockwood & Son, London, 1948, pp. 156, 10s. 6d.

The need for an objective and exhaustive treatise on the Universal Decimal Classification [U.D.C.]; has long been felt by newcomers to the use of the scheme, by potential users, and by students of librarianship in general. Dr. Bradford, with his unique knowledge of the system, both historically, theoretically, and in actual use, was obviously the authority to produce such a book, but it must be admitted that the work under review is rather disappointing in that it is not a systematic textbook, but a collection of papers of a rather controversial nature, largely devoted to meeting some of the criticisms of the U.D.C., and including some extraneous material on elementary routine in a special library, which might well have been omitted, since it has been dealt with more adequately elsewhere. To certain criticisms of the U.D.C. the author does not pay much attention. He frequently refers to the need for an index to the tables and tacitly admits that the published index is inadequate when he describes the laboriously compiled card index to the scheme which

is in use in the Science Library, a home-made substitute for a thoroughly efficient printed index, which has to be repeated in every institution adopting the scheme. He also glosses over the fact that the U.D.C. was intended primarily as a classification of knowledge for use in bibliographies, etc., and not for a library classification of books on the shelves. In practice libraries which do classify their books by U.D.C. usually have a separate scheme with simpler notation for shelf arrangement, with the result that each book has to be classified twice and receives two sets of numbers. On some points, which concern general library routine rather than the U.D.C., the author gives advice which is contrary to generally accepted practice, and on other points open to discussion he is dogmatic. Thus he repeats the well-worn statement that a decimal notation of pure numbers is the simplest, whereas the experience of the present reviewer with the Library of Congress scheme has led him to the view that, compared with the long strings of pure numbers found in U.D.C., a mixed notation, i.e. one or two letters for main classes, followed by subdivisional numbers decimally treated, is far easier to work with both in the classified catalogue and on the shelves.

Nevertheless, this is a book which should be read and will be read with profit by all who have occasion to use the U.D.C., whether as classifiers or as users of classified catalogues, bibliographies, etc. There is a chapter (24 pp.) on the building up of the numbers which gives expert advice on when and when not to use the various subdivisions. The sketch of the historical background to the scheme will also promote its understanding. S.R.B.

684. CONDIT, I. J.

The fig.

The Chronica Botanica Co., Waltham, Mass., and Wm. Dawson & Sons, London, 1947, pp. 222, bibl. 18½ pp., illus. \$5.00.

Professor Condit of the University of California, has studied and written about the fig and fig industry for some thirty years. His aims in writing this book were (1) to collate the essential facts about the fig and (2) to share with all who are interested the results of his own study and research in California during the last thirty years. It is not intended to be a textbook or a manual of practical fig culture. However, the grower who wishes to cultivate the fig intelligently will find much to interest him, and although the botanist and trained horticulturist may profit most from reading it, the practical grower will get information relating to cultural methods, particularly in Chapter XIII on fig culture, where soils, spacing, planting, intercrops, pruning, irrigation, fertilization, tillage and specialized fig culture are discussed. The nurseryman too will find information on methods of propagation in Chapter XII. It is stated that "the propagation of fig trees from cuttings is universally practised so that little attention has been paid to the use of rootstocks. The subject does, however, merit attention", and budding and grafting are described, with references to works on top-working. Chapters I to IV cover history, distribution, morphology and systematics of the fig, while Chapter V, on caprification, will interest both botanists and entomologists. In this connexion Dr. W. T. Swingle, in a foreword to the book, outlines

* Massibot, J. A., *La technique des essais culturaux* . . . (H.A., 17: 2769).

the history of the introduction of the fig into California and of his own efforts to introduce the caprifig insect. There are no photographs, such as one comes to expect in a modern book of this kind, but there are attractive vignettes relating to the early history of the fig, and text figures, mostly to illustrate morphology. It is a book that should be in every botanical or horticultural library, private or public. H.W.

685. FREAR, D. E. H.

A catalogue of insecticides and fungicides. Vol. II. Chemical fungicides and plant insecticides.*

Chronica Botanica Co., Waltham, Mass.,
Wm. Dawson & Sons Ltd., London, W.C.2,
1947, pp. 153, \$5.50.

This volume completes a catalogue of some 10,000 materials tested for plant protective value "as complete as possible up to January, 1944". The main emphasis is on lesser-known materials and references are not exhaustive regarding work on nicotine, lead arsenate, sulphur and other widely used insecticides and fungicides. The new "code number" system employed in Volume I has been used in this volume also. The task of locating a given material is greatly simplified, however, by the inclusion in this volume of an alphabetical index of the usual names of all compounds listed in both volumes. For certain purposes this catalogue should prove invaluable, but it will still be a considerable task to discover what materials have been tested for toxicity to any particular pest or disease, and it is unfortunate, although perhaps inevitable, that it is already five years out of date. A.H.M.K.

686. VAN HALL, C. J. J., AND VAN DE KOPPEL, C.

De landbouw in den Indischen archipel. Deel IIA. Voedingsgewassen en geneesmiddelen. (Agriculture in the East Indies. Vol. IIA. Food and medicinal plants.)

W. van Hoeve, The Hague, 1948, pp. 905, references numerous, illus., fl. 27.50.

The first volume (general section) of this series was reviewed in *H.A.*, 17: 1829. The series was originally conceived as a work of three volumes but it was found necessary to divide Vol. II into two parts. The present book, Vol. IIA, deals with the history, cultivation and uses of certain specific crops, viz. *Food plants*—rice, maize, sorghum, tuber plants (cassava, sweet potato, potato), leguminous plants (ground-nut, soybean, lima bean), sugar-cane culture and sugar refining by Europeans, native sugar, coconut palm (*Cocos nucifera* L.), oil palm (*Elaeis guineensis* Jack), sesame (*Sesamum indicum* L.), sago palm (*Metroxylon rumphii* Mart. and *M. sagus* Rottb.), horticulture (mixed gardening, fruits, vegetables and ornamentals). *Medicinal plants*—quinine (*Cinchona* spp.), coca (*Erythroxylum coca* Lam. and *E. novogranatense* Hieron), three Indian medicinal herbs (*Orthosiphon grandiflorus* Bold., *Curcuma xanthorrhiza* Roxb. and *Piper cubeba*). Each chapter is written by a specialist in the particular crop, and ends with relevant references to literature. There are many illustrations (mostly from photographs) of the crops, their cultivation and the preparation of the products for export. It will serve as a most useful reference book for all the tropical crops described.

H.W.

* For note on Vol. I see *H.A.*, 18: 759.

687. KNIGHT, R. L.

Dictionary of genetics.

Chronica Botanica Co., Waltham, Mass.;
Wm. Dawson & Sons, London, 1948,
pp. 183, bibl. 142, \$4.50.

The science of genetics is still at the youthful stage when workers have to coin new words in describing their research. By compiling this dictionary of current and obsolescent terms, Dr. Knight has facilitated the simplification of genetical language. The multiplicity of terms—ten are cited in the preface for one and the same thing—may not be reduced at once, but at least writers will have less excuse for such duplication in future. In the main body of the work we were disappointed to find that *saltant*, to the philologist a word suggestive of considerable activity, appears to have much the same meaning as *mutant*. Perhaps studied impartiality is the reason for defining *monochlamydeous*, *dichlamydus*, and *diplochlamydeous chimaeras*, giving alternative spellings for the first two; but *chimera*, used in the *American Journal of Heredity*, is not given. Suggestions are invited as to additions and corrections; it is hoped that such doubtful points will be cleared up and full equivalents indicated in later editions. The scope of this commendable compilation is wide; it includes terms used in cytology, animal and plant breeding and evolution. Various genetical data are given in appendices. G.K.G.C.

688. KRONENBERG, H. G., AND OTHERS.

De Aardbei. (The strawberry.)

N. V. Uitgevers Maatschappij, W. E. J.
Tjeenk Willink, Zwolle, bibl. 184, illus., fl. 8.50.

The strawberry has come under intensive investigation in various parts of the temperate zones during recent years, and much information has been acquired concerning its breeding, propagation, cultivation, pests and diseases. This information is scattered in many publications (listed in 12 pages of "Literature") and horticulturists will be grateful to the collaborators of "De Aardbei" for bringing together in one book the results of recent research on this popular fruit.

In it Kronenberg deals with the botany and varietal and breeding aspects, with costs and yields, and with strawberry growing abroad. J. D. Gerritsen deals with actual cultivation and selection, C. H. Klinkenberg with pests and diseases, M. A. Erkelens with inspection and A. K. Zweede with quality and processing. The more important aspects discussed are: Chapter II, The morphology of the various organs and their development in relation to environment. III, The genus *Fragaria* and strawberry varieties. IV, Ancient culture, heredity, and problems associated with breeding. VII, Animal pests, infective diseases (caused by eelworms, fungi and viruses), and non-infectious disorders (inherited factors, physical damage due to unfavourable weather, deficiency disorders).

The book is written with special reference to strawberry growing in Holland, but most of the information is of general application and all who are interested in growing strawberries will find it invaluable. Some of the illustrations have been provided by workers in other countries, particularly U.S.A. and Great Britain. The information is clearly set out in sections, and the print and the illustrations (118, mostly from photographs) are very clear. H.W.

689. LAWRENCE, W. J. C.

Science and the glasshouse.

Oliver & Boyd, Edinburgh, 1948, pp. 174, bibls., 15s.

The book, which is, in fact, a progress report of research on glasshouse matters at John Innes Horticultural Research Institution, is divided into three parts. Part I is a short introduction to the preparation and use of the now famous John Innes seed and potting composts which require no comment. The composts have been well publicized and their value accepted. Part II deals with methods of using the composts and of handling the plants. The plants, all grown in standard J.I. composts, were subjected to various experimental treatments as a result of which a number of facts, in the main already well known to practical gardeners, were confirmed beyond argument and at least one venerable tradition blasted. In parenthesis, it must be vastly satisfying to blast a tradition, like being able to prove to your grandmother that she has been sucking the wrong end of the egg all these years. The results of these experiments could be summed up very briefly, as is done, indeed, by the author at the end of the section, but, just as no respectable reviewer would give away the solution in a "whodunnit", so we propose to remain equally dumb concerning the problems unravelled here. Part III, entitled "Natural illumination in glasshouses", embodies much information, hitherto unavailable, which is likely to have considerable bearing on future glasshouse design and siting. It emphasizes the importance of light to winter glasshouse crops; reveals how much light is unnecessarily cut off in present-day glasshouses, even of modern design, and shows just what should be done to reduce this wastage to a minimum by (a) rational planning; (b) improved design; (c) proper siting; (d) regular cleaning of roofs. In this last instance alone, a 20% loss of light from soot deposits is common. These findings are all well supported by experimental data, many of them being of quite absorbing interest. Any grower contemplating new glasshouse construction would be unwise indeed to attempt it without a thorough study of the information set out in this book. The author is to be congratulated on having presented to the horticultural world a contribution, not only original, but one capable of endowing it with lasting benefit.

G.St.C.F.

690. LORETTE, L. (DYKES, W. R., AND CHITTENDEN, F. J., editors).

The Lorette system of pruning.

Translated from the French by W. R. Dykes. Second Edition newly revised with the Eighth French Edition by F. J. Chittenden, together with a chapter on a modified system of pruning by A. H. Lees. The Bodley Head, London, 1946, pp. 239, illus., 10s. 6d.

The first English edition of this now famous book was published in 1925 and has for some time been out of print. This new edition can be welcomed for many reasons, not least because it is so much better printed than the first and on better paper; the illustrations also are immensely improved. It is, perhaps, a little difficult for one used to English terminology to realize the difference between "lambourde" rendered

"fruitspur" and "Coursonne" rendered "fruiting lateral". The use of "branch", moreover, where we should use "lateral" is also a little puzzling.

It is even clearer now than it was 24 years ago that, in the hands of its originator, the Lorette method was highly successful; not a few of his followers, in France at least, have also obtained excellent results. What, then, can the poor reviewer say, when he finds first that attempts to adapt the method to English conditions have often met with indifferent success and not infrequently with failure; and secondly that some at least of the reasons given for his success by M. Lorette himself and by his (French) editor, M. Truffaut, can hardly be accepted as valid?

We can partly account for these discrepancies by climatic differences; our colder summers and relatively little sunshine might well lead to a slower response to summer pruning (or even to none at all, as the late A. H. Lees showed in his paper here reprinted); and perhaps by the extremely generous manuring which M. Lorette gave to his trees, which also would presumably hasten the response, a generosity which few of us can practice nowadays. It must be remembered also that M. Lorette was working solely with trees trained in various highly artificial forms, especially horizontal cordons, double U cordons, and "winged pyramids", such as are seldom seen, at least to perfection, in this country.

M. Lorette's own explanation of his success is largely concerned with "directing the sap" where he presumes it is needed. Yet in one respect at least he is on very sure ground. He insists again and again on the need for wide spacing of the branches—16 to 20 inches instead of the more usual 12. If 12 inches is too close in the relatively sunny and warm summers at Wagnonville, what can we expect from crowded branches here? A common criticism of the Lorette method, repeated by A. H. Lees in his paper, is the great amount of time necessary for carrying it out fully. And one certainly gets the impression from reading the description of the method, even though it is greatly helped out by the admirable illustrations of the new edition, that much study would be needed to carry it out satisfactorily. What, then, are we to make of the following and similar statements by M. Lorette? "My method is of childish simplicity. . . . The necessary work is light and always the same, and moreover it can be put off for a week, or even for three weeks, without causing any great damage" (p. 122).

And we find M. Truffaut declaring (p. 63) "these new principles differ entirely from the old rules: their application demands much less time", etc.

An interesting chapter on "The Peach" gives M. Lorette's rather unorthodox but apparently highly successful method—"The Candelabra"—of training peaches. M. Lorette would certainly not agree with the May pruning strongly advocated in a recent book, *Peach Growing in England*.

Those of us at least who are gardeners can learn much from M. Lorette. His advice on the wide spacing of branches has already been mentioned. The chief lesson the present reviewer has learnt is the loving care Lorette took of every one of his trees as an individual and the trouble he went to, to equalize the growth of their branches—not to mention obtaining the branches in the desired position—so as to make every tree fully

symmetrical in shape. This, rather than any explanation given in the book, accounts for his success.

N.H.G.

691. LYSENKO, T. D.

Soviet Biology.

Birch Books Ltd., London, 1948, pp. 51, 2s. 6d.

The recent changes of scientific outlook and attitude of the State to scientific workers in the Soviet Union has led to much misgiving among scientists in other countries. Some idea of the present trends in the biological sciences in the U.S.S.R. can be gathered from the address given by Lysenko at a session of the All-Union Lenin Academy of Agricultural Sciences held in Moscow on 31 July-7 August, 1948 and the discussion following his report. The present brochure is a translation into English of the address and all who are interested in the controversy should make a point of reading it to learn what Lysenko's attitude is. He condemns "Mendelism-Morganism-Weismannism" in no uncertain terms and the address is sprinkled with such phrases as "The foundation principles of Mendelism-Morganism are false", "The Mendelist-Morganists cling to everything that is obsolete and wrong in Darwin's teaching", "Morganist jargon", "The sterility of Morganism-Mendelism", "Weismann's absurd proposition", "Morgan's feeble metaphysical science", etc. The theories of Weismann and of Morgan may be open to controversy but do not merit abuse, while the fundamental concepts of heredity as propounded by the Mendelists are at any rate based on the experimental evidence of many biologists. Lysenko's contention is that acquired characters can be inherited and he bases his arguments on work carried out in Russia on the selection of hardy wheats, and, more particularly, on that of Mičurin and his followers in raising new horticultural strains by grafting. He states that Mičurin produced more than 300 new strains of plants, many of them without sexual hybridization, as a result of "strictly directed selection", and refers to Mičurin's "mentor" methods by which properties are transmitted to a young strain through twigs of an old strain which are grafted on it. That characters may be modified by grafting is well known, but how far such characters are heritable is obscure. Lysenko says, however, "We already have every ground for asserting that every graft of a plant in its youthful stage produces changes in heredity". He deplores instruction based on Mendelism-Morganism and advocates that in Russia it be replaced by the teaching of Mičurin's principles of genetics. [See also 704, below.] H.W.

692. MERCER, S. P.

Farm and garden seeds.

Crosby Lockwood & Son, London, 2nd Edition, 1948, pp. 156, illus., 12s. 6d.

This, the second edition of the late Mr. S. P. Mercer's book has been revised from the first edition published in 1938, and brought more up to date by Mr. A. Eastham, Chief Officer of the official Seed-Testing Station, Cambridge. Our review of the first edition (*H.A.*, 8: 916) should be consulted. That edition was so carefully compiled that alterations and additions are relatively few, but some have been necessary in view of work carried out at the Welsh Plant Breeding

Station, Aberystwyth, and the Seed-Testing Station, Cambridge. By more compact arrangement of the type the 205 pages of the first edition have been reduced to 156 but with no loss in clearness, and the illustrations are the same. The book can be thoroughly recommended to all who are interested in the seeds of crop and weed plants of the farm and garden, but it does not pretend to be a complete guide for the commercial producer of vegetable or flower seeds. H.W.

693. MITCHELL, J. W., AND MARTH, P. C.

Growth regulators.

The University of Chicago, Chicago 37, 1947, and Cambridge University Press, London, pp. 129, 15s.

Here is a popular account of the uses of synthetic growth-regulating substances in amateur and commercial horticulture. Separate chapters deal with weed control by selective herbicides, root stimulation in vegetative propagation, bud inhibition in relation to storage of potatoes and shrubs, control of fruit drop, control of fruit ripening, the production of parthenocarpic (seedless) fruit, and finally miscellaneous effects. This manner of presentation is becoming familiar, but here it is the violent action of the herbicide rather than the gentle action of the rooting stimulant which is first described. No references to the literature are given; a good or bad feature according to choice. A major criticism is that in making available for English readers a text written by Americans for Americans, no attempt has been made to introduce such modifications as would render it of optimal value to its new readers. Details of "hormone" preparations being marketed in this country might profitably have been included, and where possible English crops and varieties noted, such as the apple varieties Worcester and Beauty of Bath in connexion with fruit drop. Furthermore, it is disconcerting to be referred on page 91 to what is presumably a frontispiece photograph of ripening bananas when this in fact has been omitted. A feature of this little book, however, is the beautiful paper on which it is printed; in these times of continued austerity this demands our admiration. E.S.J.H.

694. VAN DER PLASSCHE, A. W. (Editor).

Tuinbouw in Engeland en de Verenigde Staten van Amerika. Verslagen van studiereizen ondernomen in 1945/46. (*Horticulture in England and in the United States. Reports on study travels undertaken in 1945/46.*)

Meded. Direct. Tuinb., 1948, 11, Supplement, 263 pp.

Reports in Dutch on certain horticultural activities in England and the United States as seen through the eyes of Dutch horticulturists who visited those countries in 1945/46. The authors of the articles and the subjects discussed are as follows:

England

Hus, P., and de Bruin, H. New preparations and new methods for controlling pests and diseases. pp. 8-32, illus.

van Stuijvenberg, J. H. M. Food preservation research. pp. 33-46.

Maan, W. J. The use of the helicopter in horticulture. pp. 47-59, illus.

Maan, W. J. Disease control. pp. 60-8, illus.

Mulder, D. Research on diseases of fruit trees. pp. 69-83, illus.

Bos, J., and Gerritsen, J. D. A general survey of horticulture in England. pp. 84-123, illus.

Béls, P. J. Mushroom growing. pp. 124-35, illus.

United States

Banga, O.—De veredeling van tuinbouwgewassen in de V. S. van Amerika. (Improving horticultural plants in the United States of America.) pp. 137-209, illus., bibl. 19.

Leeffmans, S.—Insectenbestrijding en nieuwe biociden in de V. S. (Insect control and new biocides in the United States.) pp. 210-52, illus.

695. RIETSEMA, I. (Editor).

Zesde beschrijvende rassenlijst voor fruit, 1948. (The sixth descriptive list of fruit varieties, 1948.)

Commissie voor de rassenlijst voor fruit, The Hague, pp. 148, fl. 1.25.

The fifth list was issued in 1943 (*H.A.*, 17: 44). The present one is much larger and the arrangement is different. The fruits instead of being in alphabetical order are grouped under pome fruits, stone fruits, small fruits, grapevine, and various, while varieties of the principal fruits are sub-grouped into (1) recommended, (2) suitable for certain conditions, (3) worthy of trial, (4) not recommended. Tables showing rootstock characters are included. Although written specially for the Dutch grower the brochure contains much information of general interest to fruitgrowers in other countries.

696. SMITH, K. M.

A text book of agricultural entomology.

The University Press, Cambridge, 2nd Edition, 1948, pp. 289, illus., 18s.

It is now seventeen years since the first edition of this notable, standard work on pests of agricultural crops was published; it is, therefore, a pleasure to welcome the second edition. As the author states in his preface, the bulk of the book remains unchanged, but a few new facts of the life-histories and of control measures have been added when necessary.

The study of the insect-borne virus diseases has made considerable headway, and in consequence Chapter XIV has been entirely re-written and suitable illustrations added. Thanks to the advent of the new synthetic insecticides DDT and benzene hexachloride, the control of many agricultural pests has actually been accomplished—whereas in the past their eradication remained but a dream—and in many instances Dr. Kenneth Smith has referred to their value in the role of pest control of agricultural crops. It is true that the value of these new insecticides in this field has, as yet, not been fully explored, and it is hoped that a third edition will be available before many years have elapsed, when the value of these insecticides is more fully understood. At the end of each chapter there is a list of references, and these are invaluable to the student of entomology who wishes to delve deeper into the subject. Appendix I is a crop list giving tabulated symptoms of attack and the insects associated with the injuries. Appendix II lists the weeds which act as alternative hosts of the pests concerned. The indices are also very complete, and add greatly to the value of the book. A great deal of investigation has been made regarding the value of

benzene hexachloride and other synthetic insecticides in the control of wireworms; it is, therefore, a little surprising that the use of this substance and of DDT should be dismissed in one brief paragraph on page 109. It should reach the book shelves of a very wide public.

A.M.M.

697. SOCIETY FOR EXPERIMENTAL BIOLOGY.

Growth—in relation to differentiation and morphogenesis.

S. E. B. Symposia II, Cambridge University Press, London, 1948, pp. 365.

The following well-documented articles by experts on growth phenomena are of fundamental interest to horticultural research workers:—Gregory, F. G.—The control of flowering in plants, pp. 75-103. Introduction, photoperiodism, vernalization. Hamner, K. C.—Factors governing the induction and development of reproductive structures in plants, pp. 104-16. Attainment of "ripe to flower" state, treatments with (1) low temperature, "short-day", "long-day". Harder, R.—Vegetative and reproductive development of *Kalanchoë blossfeldiana* as influenced by photoperiodism, pp. 117-38. Snow, M., and Snow, R.—On the determination of leaves, pp. 263-75. Heath, O. V. S., and Holdsworth, M.—Morphogenetic factors as exemplified in the onion, pp. 326-50. Normal development, bulb development, inflorescence initiation, inflorescence emergence and interrelation with bulbing.

698. SPRENGER, A. M.

Het leerboek der fruitteelt. (Handbook of fruit growing.)

N. V. Uitgevers, Maatschappij, W. E. J. Willink, Melkmarkt 2, Zwolle, 1948, 2 vols., pp. 1,119, illus, fl. 33.50.

We are told in the preface that when the fourth edition of *Het Leerboek der Fruitteelt* by Claassen, Hazeloop, and Sprenger was exhausted there was need for a book that, in addition to the technique of fruitgrowing, would give some attention to the biology of fruit plants. Professor Sprenger, the only survivor of the original three, was asked by the publishers to produce a fifth edition, which he undertook to do, asking a number of specialists to be responsible for their particular subjects. The result is a book that can be relied upon to give accurate and up-to-date information on the science of fruitgrowing in temperate climates. The authors and subjects treated are as follows:

Nieuwstraten, J. P. The biology of fruit plants.
de Bakker, G. Choice of ground and its cultivation.
de Bakker, G. Manuring.
van der Muijzenberg, E. W. B. Technical aids in commercial fruit growing.
Hus, P. The diseases and pests of fruit plants.
Minderhoud, A. The role of bees in relation to fruit growing.
Bos, J. Fruit growing in the open.
van der Slikke, C. M. Fruit growing under glass.
van Hennik, J. J. The economics of fruit growing.
van Hiele, T. Storage.
Zweede, A. K. The use and processing of fruit.

The first section occupies about one-third of Volume I and deals with the anatomy, physiology, and reproduction (sexual and vegetative) of fruit plants; it includes such subjects as pollination, parthenocarp, polyploidy,

rootstocks, and the use of growth substances. Section V is comparatively short and deals with pests and diseases in general terms, the specific insects or parasites being discussed under the host plants in Section VII, which takes the fruit species in turn, describing them and their culture in some detail. Those who are interested in growing fruit under glass will find Section VIII particularly instructive. It is divided into three parts: A. General (discussing species suitable for growing under glass, types of glasshouse, operations to ensure success, etc.). B. Fruits commonly grown under glass, i.e. grapes, peaches, *Prunus* spp. C. Fruits sometimes grown under glass; these are pear, red currant, cherry, fig, pineapple, banana, tree tomato (*Cyphomandra betacea*) and papaw.

The book, as its title indicates, is in Dutch and it has a natural bias towards fruitgrowing under Dutch conditions, but most of the information is of general application, and horticulturists and up-to-date growers in other temperate regions will find, if they can read the language, that these two volumes are an invaluable source of information on theory and practice. They are well illustrated and contain a comprehensive bibliography.

H.W.

699. THOMAS, M.

Plant physiology.

J. & A. Churchill Ltd., London, 3rd Edit., 1947, pp. xi+504, bibl. 344, illus., 28s.

The appearance of a third edition of Professor Thomas's textbook is indicative of its continued use to the student. Certainly the physiological approach to botanical science requires more emphasis, and there are few attempts to provide this, particularly at the formative period of biological training. At a later period, perhaps, the manifold difficulties attending the presentation of an experimental science are realized, and then a general survey of the complete field in one treatise is no longer expected. Thus while the student who possesses this book may be thankful for a lucid account of the main topics of plant physiology, a practising physiologist appreciates its readability, its effort in steering a path through a maze of literature without over-simplification at the expense of accuracy, and its sense of experimentation.

A further recommendation is that this book can be read with profit by all concerned with the growing of economic crops. Horticulturists are already familiar with technical bulletins and communications dealing with various aspects and problems of their profession, and these often involve physiological considerations. That few of these find specific mention here is not really important, for more than anything else it is the foundation which Professor Thomas lays which is so vital. Over this can be assembled the superstructure of horticultural techniques:—propagation methods, the grafting process, stock influence, pruning principles, the mineral nutrition of plants, and many other aspects which pose physiological problems often still not resolved.

Not the least valuable part of the book are two appendices, the first giving short chemical notes about the main metabolic substances of the plant, and the second providing an introduction to the physical chemistry of solutions as it applies to the relationships of plant cells. A third appendix lists over three hundred

references, which will enable the reader to extend his physiological excursion in the direction of his choice.
E.S.J.H.

700. TYSSER, H. F. (Editor).

The fruit annual and directory 1948-9.

British Continental Trade Press Ltd., 222 Strand, London, 1948, pp. 348, £1 post free.

This useful annual follows much the same lines as last year [see *H.A.*, 18:1527], affording a number of eminently readable and practical articles on the following and other subjects:—world fruit trade, fruit growing in England, Italian difficulties, world citrus production, production and distribution of bananas and pineapples, new methods of packing citrus, market fruits and their varieties [a selection and description of favourite varieties of 78 kinds of fruit from many lands], fruit supply calendar, developments in fruit shipping, the origin and method of a Dutch auction, dried fruit production and distribution, storage problems, freezing soft fruits, freezing fruit juices, directory of fruit trade and accessories.

701. VELDHUYZEN VAN ZANTEN, N., AND OTHERS.

Algemene veredelingsdagen 1947. (Horticultural plant breeding days.)
Meded. Inst. Vered. TuinbGew. 8, 1948, 87 pp., illus.

This report consists of papers (each with a summary in English) read at a conference held at Hilversum in 1947. After an opening speech by the president, N. Veldhuyzen van Zanten, there are reviews, by different horticulturists, of recent work on certain aspects of plant breeding, e.g. the urgency of plant breeding (O. Banga, R. Zwaan, I. Rietzema), the cost of breeding work (C. Koopman), vegetative reproduction in vegetables (S. J. Wellensiek), vegetative propagation of fruit trees (J. Floor), and vegetative propagation in cabbage breeding (J. Sneep).

702. VERLEYEN, E. J. B.

Le bouturage et les substances de croissance synthétiques. (Propagation of plants by cuttings and synthetic growth substances.)
Doctor's Thesis Univ. Louvain, Antwerp, 1948, pp. 198, 37 plates, bibl. 484.

The problem to which Professor Verleyen has devoted himself concerns the rooting process of the cutting with special regard to the stimulatory action of synthetic growth substances. He has worked with various herbaceous, woody and coniferous species, observing their behaviour as softwood cuttings under conditions of bottom heat and high moisture in special glasshouse compartments, river gravel being the planting medium. The two growth substances used were indole-3-acetic acid and α -naphthaleneacetic acid applied by the solution method. He shows a thorough appreciation of the external and internal factor complex involved in root regeneration by the cutting, and has not, therefore, over-emphasized the role of the growth substance. Two results only, not unconnected with each other, are singled out for special mention. In the first place critical experiments with cherry laurel on the application of two successive growth substance treatments, with and without the removal of the basal region of the cutting receiving the first treatment, demonstrated that such treatments have independent

effects. The conclusion drawn, however, that such effects do not involve the basipetal displacement of some substance present in the cutting required for root-formation is perhaps not wholly justified, for the influence of the first growth substance treatment may not have operated at the time when the second treatment was applied. Such a possibility appears the more likely in view of his other observation that the application of relatively high concentrations of growth substance for much shorter periods has a particularly beneficial effect. The pursuit of this idea to its logical conclusion would, of course, lead to the instantaneous treatment of the concentrated alcoholic dip, a technique not studied in this work. As befits a thesis, the approach to the subject of research is made in a comprehensive and historical manner with copious references to the literature. Also, since it is a thesis, the author can and does present it in large and luxurious print and format, scorning paper economy, to the great benefit of the reader. And this pleasant spaciousness also allows of the inclusion of summaries in Dutch, German, English, Spanish, Polish, Portuguese and Russian. Finally Professor Verleyen admits that the exact mode of growth substances in stimulating root formation can still be debated. E.S.J.H.

703. WESTON, W. A. R. D., AND TAYLOR, R. E.
The plant in health and disease.
Crosby Lockwood, London, 1948, 173 pp.,
illus., 21s.

The control of pests and diseases of crop plants is under intensive research in this country and abroad and growers who are prepared to make full use of the published results of these investigations can do much to increase the world's food supplies. Valuable information on the subject will be found in this book by Drs. Dillon Weston and Eric Taylor of the Cambridge University School of Agriculture who write with the authority derived from personal research and field observations. The diseases discussed are mostly those of crops grown on arable ground, but the horticulturist will find useful advice on certain crops that are grown not only in the field but also in the garden, e.g. potatoes, peas, broad beans, and celery, and Chapter 13 gives an account of tomato diseases. All growers, whether commercial or amateur, particularly those who expect early and accurate advice from experts on treatment for specific plant diseases, are advised to study Chapter 7, which shows that the diagnosis of a disease—which must precede any recommendation for control—is often far from simple. Emphasis is on the maintenance of plant health rather than the treatment of plant diseases, one chapter being devoted to nutritional disorders, but modern methods of controlling or preventing diseases that are, or threaten to be, destructive, are also given, with detailed instructions in some instances. There are 60 plates of excellent photographs, and a coloured frontispiece showing four types of virus diseases. A novelty is seen in the photographs of glass models of fungi, showing the organisms more realistically than would be possible in any other way. Readers with some botanical knowledge may find the earlier chapters rather elementary, but for others they will serve as a readable introduction to the principles underlying health and disease in plants. The subject

matter is presented in an interesting style with a minimum of scientific terms, the print is clear, and there appear to be very few misprints. It is a book that can be thoroughly recommended to advisory officers and to all progressive growers of farm crops. H.W.

704. ZHERBRAK, A. P., AND OTHERS.
Soviet Biology from the discussion on the Lysenko Report.

Engels Society, London, 1948, pp. 49, 5s. 6d.

This consists of contributions to a discussion at the Lenin Academy of Agricultural Sciences. The contributions reproduced in this duplicated collection are verbatim (in English translation) and were chosen to represent different viewpoints. They are mostly discussions on Darwinism and evolution, with particular reference to Mičurin's work. They should be read in conjunction with Lysenko's report. [See above 691].

705. CHESHUNT.
Thirty-third Annual Report of Cheshunt Experimental and Research Station 1947,
1948, pp. 114.

Tomatoes: In experiments comparing steam and formaldehyde sterilization of soil and their effect on irregular ripening in the variety Potentate, the stronger growth of plants on the steamed soil was accompanied by a higher incidence of blotchy ripening. A glasshouse experiment in which straw walls (2 in. thick and 20 in. deep) were placed in the soil, one each side of every double row, and down which water was applied, confirmed earlier results and showed an increase of 27% in crop over the control. In variety trials, Single Cross, K.C.B., and Radio were best in quality and yield. Selandia and Tuqueen, both Potentate types, are unsuitable for the English market, their fruit being large and coarse. *Cucumbers:* Straw compost made by the Adco process gave yields equal to the best horse manure when used in the preparation of beds and in top-dressing. *Plant diseases:* In preliminary experiments on the influence of plant nutrition on the susceptibility of the tomato to *Didymella lycopersici*, excessive nitrogen was found to favour infection. Evidence suggests that an excess of manganese may render the tomato plant more susceptible to infection. Further work on the influence of low temperatures on the spores of *Didymella* is reported. Virus investigations were concerned with the influence of environmental factors on infection. The necessity for keeping tomato plants turgid so as to reduce the severity of virus attack, and the beneficial effect of sunlight, were demonstrated. Work on antibiotics continued. Tests showed that sugar beet waste is a satisfactory medium for the production by *Penicillium patulum* of an antibiotic which inhibits the growth of several soil organisms pathogenic to the tomato. *Pests:* An illustrated account is given of the tomato moth, *Diatraea oleracea*. Reference is made to the large collection of insects and allied animals associated with glasshouse plants which has been built up over the past 25 years. *Insecticides:* In glasshouse trials Azobenzene fumigation gave results at least equal to those given by petroleum emulsion sprays in controlling red spider mites (*Tetranychus telarius*), but complete control of the adult mites was not achieved. The use of thermo-generated azobenzene smokes was investigated. Very

promising results were obtained in preliminary trials with hexaethyltetraphosphate, which proved considerably more toxic to some aphids than nicotine. *Chemical problems*: Nitrification studies were continued and extended. Work on various methods of analysing glasshouse soils was concluded with attempts to correlate analytical data with plant production and uptake of the main nutrients. On the basis of dry matter production the best correlation is given for potash when the latter is estimated by the N/2 acetic acid method. The same method of extraction gives the highest correlation for potash uptake by the plant. By far the best correlation for the uptake of phosphoric acid is shown when phosphate in the soil is extracted by distilled water. The most striking results emerge from the data for nitrogen, where high positive correlation was found between growth and soil nitrogen. Investigations into the possibility of using sodium alginate as a source of organic carbon in composts indicate that this material compares favourably with stable manure both for sowing and potting mixtures.

706. DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH, LONDON.

Food Science Abstracts.

H.M. Stationery Office, London, 1949, Vol. 21, No. 1, pp. 68, £2 a volume.

This is the first number of the revised and enlarged Index to the Literature of Food Investigations. The new journal will appear either 5 or 6 times a year and will cover among other subjects the technical aspects of the storage, processing and transport of foodstuffs of every sort including those which are horticultural and plantation crop products. Readers of *Horticultural Abstracts* who are interested in these subjects are strongly advised to see copies.

707. ESTACIÓN AGRÍCOLA EXPERIMENTAL DE PALMIRA.

Notas Agronómicas, 1948, No. 1.

A new technical publication issued by the Palmira agricultural Experiment Station, Colombia, edited by G. Fernando Villamil.

708. FRIEDSDORF (MÖHRING, H. K.).

XXI Tätigkeitsbericht der Gärtnerischen Versuchsanstalt zu Friesdorf/Bad Godesberg. (21st Annual Report of the Horticultural Research Station of Friesdorf, near Godesberg) Germany, 1948, pp. 48.

The 21st Annual Report—for the year 1947—appearing 7 years after the 20th, includes the following items: (A) Varietal yields of a number of cut flowers. (B) Chrysanthemum variety trials. (C) The evaluation of varieties of *Primula obconica* and *P. malacoides*. (D) The effect of planting methods on the yield of tomatoes; best results, judged by yield and financial returns, were obtained with a pyramid consisting of 4 steel wires 50 × 60 cm. apart, tied together at the top, the distance between rows being 70 cm. (E) The effect of the colour of an espalier wall on tomato yields: plants grown in front of a black wall yielded 13% more ripe fruits than those grown in front of the untreated part of the wall. (F). Mushroom growing in the open. (G) Yield trials with dwarf bean and pea varieties. (H) Rooting experiments with apple varieties and seedlings: Apple varieties were induced

to form roots by peeling the bark of young or maiden trees above the union, treating the exposed cambium with growth substance and planting deep. Cuttings of the roots induced in this manner were used for further propagation of the variety. Root cuttings were, moreover, successfully used in building up apple seedling clones. Detailed figures for the rooting response of varieties and seedlings are presented. Trees of 8 varieties on their own roots are now far enough advanced for yield trials to begin in comparison with trees of the same varieties worked on E.M. rootstocks. (J) The propagation of *Prunus ackermann* by root cuttings. Best results were obtained by planting the cuttings in frames. (K) The effect of different rootstocks on the peach variety Amsden: Of 7 rootstocks compared, trees on *Prunus ackermann* gave the highest yields. (L) Expenditure and returns from a spindle bush planting of bearing age: Detailed figures are given. A plea is made for basing yield figures in fruitgrowing on area and not on trees.

709. (GARTENBAU-FORSCHUNG.)

Institutsberichte aus Weihenstephan. (Reports on work at Weihenstephan.)

Gartenbau-Forschung, Hft. 1, 1947, Limes-Verlag, Wiesbaden, pp. 104 [received 1948].

The first number of a new series of publications, edited by J. Becker-Dillingen, Director of the Weihenstephan Institute, Freising, is devoted to reports by three institutes at the horticultural college and research station of Weihenstephan on the work carried out by them during the war.

710. HOCHSCHULE FÜR BODENKULTUR, VIENNA.
75 Jahre Hochschule für Bodenkultur. (75 years of the Vienna Agricultural College.)
Jb. Hochsch. Bodenk. Wien 1947, Bd. 1, 1948, 1. (allg.) Teil, pp. 206.

A history of the agricultural college of Vienna since its foundation 75 years ago, and a review of its present activities.

711. HOCHSCHULE FÜR BODENKULTUR, VIENNA.
Fortschritte der Bodenkultur. (Agricultural progress.)
Jb. Hochsch. Bodenk. Wien 1947, Bd. 1, 1948, 2. (wiss.) Teil, pp. 250.

Fortschritte der Bodenkultur is a collection of papers on topical agricultural subjects from the Vienna agricultural college. Publication is to be annual.

712. INDIAN AGRICULTURAL RESEARCH INSTITUTE, NEW DELHI.
Scientific Reports of the Indian Agricultural Research Institute for years ending 30 June 1946 and 1947, pp. 109 and 131 [received 1948].

These include, in addition to the director's report, short reports from the following divisions: agriculture, botany, sugar-cane research, soil science and agricultural chemistry, entomology, mycology, and agricultural engineering.

713. INDIAN TEA ASSOCIATION.
Annual Report Indian Tea Association, Scientific Department, Tocklai Experimental Station 1947, 1948, pp. 36.

Field experiments: In an experiment with 7 kinds of shade trees, tea under *Albizia odoratissima* and *A.*

stipulata (both green and red) gave the highest yield, while the non-shaded control plots gave the lowest. Lack of shade was associated with red spider attack, which was most severe on unshaded tea. The increases recorded in an experiment to study the effect of shade and nitrogenous manures (sulphate of ammonia and oilcake), alone and in combination, were from (a) manure alone, 7.3 maunds per acre (1 md.=80 lb.); (b) shade alone, 8.8 md.; (c) manure and shade, 12.9 md.—but the interaction between shade and manure was negative. Shade alone proved of more benefit than manure alone—an important consideration when manures are scarce and expensive. Manures: The 1936 to 1947 yields from an experiment in which dark and light leaf jats received inorganic manures only (N, P, and K at 3 levels) are tabulated and discussed. Interesting results are reported from an experiment in which phosphatic manure (superphosphate) at only 15 lb. phosphoric acid per acre gave significant increases of at least 1 md. of tea per acre over 3 years on the shaded plots, but no increase on unshaded plots. The effects of P and K manures and shade on the growth of *Tephrosia* are reported and discussed. *Soil research*: A method for measuring the intensity of shade, based on decomposition of a solution of oxalic acid and uranyl sulphate (after the method used by workers in Hawaii), proved successful. *Entomology*: Work is reported on the tea pests *Helopeltis theivora*, red spider, *Tetranychus bioculatus* and the looper caterpillar, *Biston suppressaria*. The control of the pests of *Tephrosia candida* is discussed. *Botanical investigations*: These are reported under: observations regarding the nature of quality in tea, the classification of the tea plants of commerce, vegetative propagation of tea, vegetative and generative clones, new introductions, and ancillary activities. An appendix, in tabular form, shows the current methods of tea breeding at Tocklai.

714. KENTUCKY.

Sixtieth Annual Report Kentucky Agricultural Experiment Station 1947, 1948, pp. 76.

The report includes brief accounts of work on: manurial, pruning and time of cutting experiments with Burley tobacco; meadow nematodes and brown root rot of tobacco, etc.; Burley and dark tobaccos resistant to black root rot, mosaic, wildfire, fusarium wilt and other diseases; the low-nicotine tobacco Type 31V; an inhibitor of streak virus in tobacco; insects as possible vectors of streak virus; reaction of tobacco varieties (460) to streak; control of wild garlic and wild onion with 2,4-D; apple, peach, grape, strawberry, black raspberry, tomato, bean, sweet corn, and cucumber varieties; apple scab; insect pests of peaches; peach pruning; red stele of strawberries; strawberry renovation; fertilizers for potatoes and tomatoes; sprays against tomato blight; autumn versus spring ploughing and rototilling versus mouldboard ploughing for early tomatoes; and marketing green-wrapped tomatoes. Short reports follow on the Western Kentucky and Robinson Substations.

715. LOIZIDES, P. A.

Annual report of the agricultural chemist [Cyprus].

A.R. Dep. Agric. Cyprus for 1947, Appendix V, pp. 6.

This report includes notes on mineral deficiencies in plants with particular reference to the cause of leaf scorch prevalent on apple and other trees on the hill areas from Prodromos to Platres, and an account of potato manurial trials with the variety Up-to-Date (data tabulated).

716. MADRAS DEPARTMENT OF AGRICULTURE.

Reports on the work of the Agricultural Stations in the Madras Presidency for 1945-46, 1948, pp. 518.

This embraces reports from 32 stations, including 4 for fruit and 1 for sugar-cane. *Pomological Station, Coonoor, Nilgiris*. Variety, nursery and orchard trials with apples, pears, plums, peach and persimmon are briefly reported. Other fruits referred to are prune, apricot, cherimoyer, passion fruit, strawberry, and cape gooseberry. Short notes are given on experiments in cabbage seed production and pyrethrum spacing. *Burlar Fruit Station*. Nursery work is reported on mangosteen, jak-fruit, bread fruit, litchi, durian and nutmeg. *Kallar Fruit Station*. It is suggested that for a successful off-season mangosteen crop the preceding dry season must be a prolonged one. Notes and figures are given on the incidence of gamboge in mangosteen fruit. The possibility of finding gamboge-resistant strains is discussed. Nursery tests with mangosteen are reported using seed with and without pulp, healthy and gamboged seeds, and seeds of different age. The following successes are recorded: the side-grafting of mangosteen and the grafting of the common papaw on the hill [mountain] papaw. The results of layering trials with 6 litchi varieties are tabulated. It is stated that self-pollination can take place in the rambutan. *Fruit Research Station, Kodur*. Some results of citrus rootstock trials are reported. Sathgudi orange on *Feronia elephantum* was precocious and gave fruit of excellent quality, but undersized. Variety collections of 74 citrus and 110 mango varieties were maintained. The results of trials of propagating methods with mangoes are tabulated. Brief descriptions are given of some F₂ mango hybrids. *Sugarcane Research Station, Gudiyattam*. Variety, manurial, and time of ripening trials are reported. Particular attention was paid to finding drought-resisting varieties. Yield trial results over 3 years show Co.449 the best variety in yield of cane and recovery of jaggery.

717. MAINE.

Sixty-fourth Annual Report of Progress, Maine Agricultural Experiment Station, year ending 30.6.48.

Bull. Me agric. Exp. Stat. 460, 1948, pp. 75, illus.

This highly condensed report includes brief notes on the following, amongst other subjects: *Apples*: winter-hardy stocks, new varieties, new fungicides, spray deposits, spray booms, manuring, insect and other pests, maintenance of quality and the reduction of marketing losses. *Beans*: new varieties, control of Mexican bean beetle, and the bean weevil. *Blueberries*: fruit fly, thrips, control of disease and weeds, fertilizers, soils, new tool for transplanting, increasing plant stand, rooting cuttings, artificial pollination of flowers, oil burners for burning blueberry land. *Sweet Corn*: breeding and variety trials, European

corn borer, control of weeds by herbicides, nutgrass control with 2,4-D. *Cucumbers*: breeding scab-resistant varieties. *Lettuce*: control of yellows. *Peas*: liming, manuring and seed rate. *Potatoes*: haulm killing, aphid control, leafroll, dissemination of virus diseases, sprays and dusts for blight control, disinfectants for controlling ring rot, purple top disease, control of seed-piece decay, development of new disease-resistant varieties, tuber disease in storage and transit, variety and fertilizer trials, including trials of radioactive phosphorus in fertilizer, application of mulch, irrigation, greensprouting and thiourea treatment, chemical weed control, harvesting, storing, grading and marketing. *Strawberries*: variety trials. *Tomatoes*: variety trials and control of late blight.

718. NEW ZEALAND DEPARTMENT OF AGRICULTURE.

Annual Report of the Department of Agriculture, New Zealand 1947-48, 1948, pp. 86.

Horticultural Division report pp. 80-6: The acreages under pome, stone, and citrus fruits are given as: apples 8,790, pears 1,050, stone fruit 4,710, citrus 1,570. The apple and pear crop estimates were 2,842,000 and 352,000 bushel cases respectively. Export of pome fruits to Britain was resumed on a pre-war scale and it is anticipated that during the next few years Britain will provide an assured market for all the fruit that New Zealand can export. The area under small fruit continued to expand. A representative collection of the best raspberry stocks was planted at the Dominion Horticultural Station, Levin, to compare their vigour of yield and to decide questions of identity. Black currant and raspberry plants from East Malling Research Station, England, have been acclimatized and are being propagated. The work done at Levin should be of the greatest benefit to small-fruit growers in New Zealand. The comparative freedom of New Zealand raspberry stocks from virus diseases was commented upon by C. H. Cadman of the Scottish Raspberry Investigation, who visited the Dominion recently. Viticulture: The estimated production of wine and glasshouse grapes was 2,200 tons and 600,000 lb. respectively and the area under wine grapes 850 acres, producing 428,000 gallons of wine, mostly of the sweet red and sweet white kinds. Viticultural work at Te Kauwhata Horticultural Station is referred to. Vegetables: Experiments were carried out, with promising results, to find practical means for controlling the carrot-rust fly, potato tuber moth, white butterfly, red-legged earth-mite, and other pests and diseases. Tobacco: The industry continued to expand, the 1947 acreage being 3,900 odd. Hops: The 1947 production was 2,500 bales approx. *Phormium tenax* (p. 28): Greater interest was shown in the industry, the production of fibre, tow, stripper slips and unscutched fibre (straw) being 4,600 tons approx. The Department's target is 10,000 tons.

719. NORTHERN RHODESIA.

Annual Report of the Department of Agriculture N. Rhodesia for the year 1947, 1948, pp. 15, 1s.

A vegetation-soil map of the Territory, the result of many years of ecological study, was published during the year and should prove of great value in planning development. Tobacco investigations: At Msekera

Tobacco Station the 4-course rotation of tobacco-tobacco-sunn hemp-maize continues to give satisfactory results on fertile red loam. Trials of new rotations which incorporate grass leys have been started as well as experiments on spacing tobacco plants in the field, and eelworm control. Bonanza and Jamaica Wrapper gave the best yields in the variety trials this year.

720. SARAWAK.

Annual Report of Sarawak Department of Agriculture for 1947, Kuching, 1948, pp. 19+1 map.

This report, the first to be prepared since 1940, includes some general information on agriculture in the country and a brief statement of the present, provisional, policy regarding future development. With regard to the development of crops other than rice, general considerations suggest that long-term crops, especially tree crops, are more likely to repay attention than short-term crops. The most important export crops at present are rubber and, of considerably less importance, sago. Possible export crops for the future are cocoa, coconuts, manila hemp, kapok, ramie, oil palm, cashew nut, citronella grass, pepper, tea, pineapples, and derris. Owing to the generally poor and variable soils it is unlikely that large uniform areas of any one crop will develop. Some proposed experimental work is described.

721. U.S. DEPARTMENT OF AGRICULTURE.

Report on the agricultural experiment stations, 1947.

U.S. Govt. Printing Office, Wash., D.C., pp. 126, 25 cents.

A skeleton survey of work in progress. An interesting section sketches in the high lights of horticultural research but those wanting names of workers and precise details will have to look elsewhere, namely in the reports of separate stations or in scientific journals.

722. WEST AFRICAN CACAO RESEARCH INSTITUTE.

A.R. West African Cacao Research Institute, Tafo, for 1946-47, 1948, pp. 70, 5s.

Virus research.—Many strains, probably involving several distinct viruses, have been recorded in the Ivory Coast, Gold Coast and Nigeria. Much has been discovered concerning the inter-relations of the strains; cacao infected with certain strains may become protected against some others. Chemical control of the field vectors, *Pseudococcus* spp., seems out of the question. No seed transmission of cacao virus has been obtained. Alternative hosts, from which cacao virus has been transmitted back to cacao, include *Theobroma bicolor* and the indigenous *Cola chlamydanthra*. The spread of swollen-shoot can be controlled by cutting out infected cacao, but infection may recur. On suitable soils cacao can be re-established after the removal of diseased trees. *Capsid research*.—The death of soft shoots may be due to mechanical injury caused by feeding punctures made by capsids. Extensive die-back may result from the invasion of the fungus *Calonectria rigidiuscula* through feeding punctures. Capsid pockets, small areas showing chronic damage, have been induced by pollarding healthy cacao; subsequent sucker growth is ideal for breeding and feeding. Good temporary protection can be

obtained expensively with nicotine sulphate. Promising results have been obtained by painting with DDT parts of young trees where capsid nymphs shelter; residual toxicity has lasted for five months. *Botanical*.—Various *Theobroma* spp. introduced from the West Indies and South America have been established; no capsid damage has been observed on species other than *T. cacao*. For rooting cacao cuttings the use of 0.5% β -indolebutyric acid in talc has been adopted as standard treatment. Other research topics reported include the association of fungi with capsid damage, the physiology of the cacao plant, and various aspects of cacao agronomy.

723. ZANZIBAR PROTECTORATE.

Annual Report of the Department of Agriculture, Zanzibar 1947, 1948, pp. 55, Shs. 2.

The campaign for increased food production continued to be a major occupation of the department. The clove crop exceeded 38 million lb., 88% coming from Pemba. The programme of the Clove Research Scheme, to be carried out by a separate team, was approved. The planting of cocoa, a possible export crop, continued. Attention was also given to several other potential export crops. Kizimbani Experiment Station: High praise is given to the tropical Kudzu (*Pueraria phaseoloides*) which may prove to be the ideal

cover crop for clove plantations. For coconut plantations *Centrosema pubescens* appears to be valuable as a permanent cover crop. Following striking successes with annual crops, sodaphosphate [silicophosphate] was substituted in clove manurial trials for superphosphate, which has never given significant responses in past experiments. Work is also reported on: food crops, cocoa, coffee, coconuts, citrus, pineapples, bananas, kapok, rozelle hemp (*Hibiscus sabdariffa*), oil palms, *Aleurites moluccana*, chillies, nutmeg, derris and papaws for papain. The introduced pineapple, California Red, although of excellent shape for canning, is reported to be poor in flavour and texture.

724.

The following also have been examined:

- a *Climate of British Columbia, Report for 1946*, pp. 27 [received 1949].
- b *Climate of British Columbia, Report for 1947*, pp. 26 [received 1948].
- c *Jaarverslag van den proeftuin "Z.H. Glas-district" Naaldwijk, 1937-1944 and 1946*. (A.Rs. South Holland Glasshouse Station, Naaldwijk, 1937-1944 and 1946.)
- d *57th A.R. Wyo. agric. Exp. Stat. 1946/47*, pp. 61.

